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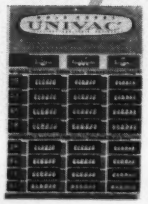

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About Our CONTRIBUTORS

Bernard J. Garn, B.S. (College of the City of New York, 1940) D.D.S. (New York University, College of Dentistry, 1943) has been a contributor to DIGEST since 1947 and has also published a number of articles elsewhere, as well as several books for children in collaboration with his wife. His most recent is A Visit to the Dentist, published by Grossett and Dunlap. In the current issue Doctor Garn presents the first installment of a two-part article, The Emotional Basis of Dentofacial Development.

Irving A. Gerber, A.B. (New York University, 1934), D.D.S. (University of Buffalo, School of Dentistry, 1937) specializes in restorative dentistry. Doctor Gerber last published in DIGEST in September 1958 when he presented a procedure combining rotary and ultrasonic technique in tooth preparation. This month Doctor Gerber's title is Periodontal Disease as Viewed by the French Stomatologists.

Joseph Stewart Frost, D.D.S. (University of Pittsburgh, School of Dentistry, 1928) is engaged in the practice of general dentistry. He presents in this issue the second and last installment of his article A Simplified Procedure for Immediate Dentures.

Jay W. Friedman, D.D.S. (Columbia University School of Dental and Oral Surgery, 1948) is in the practice of general dentistry and has published a number of articles on dental subjects. His second presentation in DIGEST is Fixed Porcelain Restoration After Alveoplasty, in the current issue.

Coyl B. Thomas, D.D.S. (St. Louis University, School of Dentistry, 1929) first published in DIGEST in May 1957. This month he presents another article drawn from his clinical experience, a four-part serial entitled Fixed Bridge Assembled in the Mouth. Part One appears in this issue.

EDWARD J. RYAN, B.S., D.D.S., Editor
WANDA T. PICKARD, B.A., Assistant Editor
708 Church Street, Evanston, Illinois

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The Emotional Basis of DENTOFACIAL DEVELOPMENT – *Part One*

BERNARD J. GARN, D.D.S., New York

DIGEST

This is the first installment of a two-part acticle in which the hypothesis is advanced that the emotions are the most significant factor in the production of the final form of the facial skull and dental arches. This must be true because of the observable evidence on the human face as it is seen through the trained eye of the artist and the inner eye of race-knowledge. The physiologic mechanisms responsible for this phenomenon are demonstrated.

Physiognomy

The belief that dentofacial development is based upon emotional factors is the essence of the "science" of physiognomy. Socrates believed that character and disposition could be read from the lineaments of the face, and Aristotle published the first compendium of physiognomy. In 1743 the English Parliament passed a law to make the practice of this art punishable by whipping and imprisonment; a hundred years later Cesare Lombroso, "the father of modern criminology", based his entire system of criminology upon the classification and analysis of facial types.

Reversal of Opinion—In recent times the pendulum has again swung the other way, and there is a feeling that any attempt to judge character by an analysis of facial structure is fraudulent.

Evidence Presented—This discussion endeavors to show that (1) there is a strong *a priori* argument to prove the validity of physiognomic analysis, and (2) there already exists enough scientific evidence to demonstrate both the relationship between dentofacial development and the emotions, and the *mechanism of that relationship.*

The A Priori Argument

So universal is the practice of poets and writers to demonstrate character by describing facial structure that this approach is taken for granted. If the author neglects to delineate features the reader imagines them to conform to the idea of the character. Could Shylock possibly be confused with Falstaff, or Iago with Brutus? Actors rely upon the viewer's knowledge of physiognomy when they create character by means of make-up and facial expression.

Character Revealed in the Face—The pictorial artist and the sculptor, in creating faces, create a communicable concept of human character. If the character of man were not written on his face could there be any art? Malraux, in his epic *Voices of Silence* makes the changing conception of the human face (as it expresses the character of its time) the key to the understanding of art.

Character in Visual Art—Rouault's "Judges" are almost caricatures, yet by means of a few lines and shadows the story of their lives is known. If character is not truly expressed in the features why does the sensuality of a Greek statue become meditative and serene when the Buddhist sculptor changes the shape of the nose and the eyes? Again, the pictorial artist and the sculptor, like the writer and the actor, communicate through an innate knowledge of the subject. Henry James refers to this knowledge when he says, "His physiognomy indicated that he was a shrewd and capable fellow."

Language and Facial Expression—With the use of idioms such as "tight-lipped," "square-jawed," "wide-eyed," "shifty-eyed," or "down-at-the-mouth" a character or emotion is described by means of the facial conformation associated with it. In language emotional states are equated with facial expression in words like despise (de-*down*; spicio-*look*) or supercilious (super-*over*; cilium-*eyebrow*).

The Face and Character in Folklore—An old English folk saying, "May the man be damned and never grow fat, who wears two faces under his hat," not only equates character with face, but duplicity of character with being two-faced. According to a Latin proverb "The face is the portrait of the mind; the eyes its informers." In German it is expressed "Wenn man eine offening hab zwischen den zwei mithleren zahne, konit man weit in die welt." (He who has a space between his front teeth will go far in the world.) In Japan where rigid control of the emotions has been developed to a high degree, the idea of "saving face" is identical with maintaining integrity of character.

Facial Structure as Psychologic Reference — In his classification of character types, Erich Fromm delineates the various psychic qualities referring consistently to facial structure. His "receptive orientation" has "the mouth (as) an especially prominent

feature, often the most expressive one. The lips tend to be open, as if in a constant expectation of being fed. Being fed is a frequent symbol of being loved. . . ." In the "exploitative orientation" he mentions a "biting mouth" as being a feature encountered in this type of character. And a "tight-lipped" appearance is present in those persons falling into his "hoarding orientation" category.[1]

This, in brief outline, is the *a priori* argument for the validity of physiognomy. Certainly it is a complicated subject and has until now eluded scientific measurement and classification. But to deny that human character is written on the human face is to deny all of art and literature, much of language and the culture of all races, and an obvious part of the nature of man.

1.
Illustrating the three principles governing the muscular expression of the emotions (after Darwin). The hostile dog shows the principle of Serviceable Associated Habits, the friendly dog shows the Principles of Antithesis, and the terror-stricken man shows the Principle of the Direct Action of the Nervous System.

The Basic Mechanism

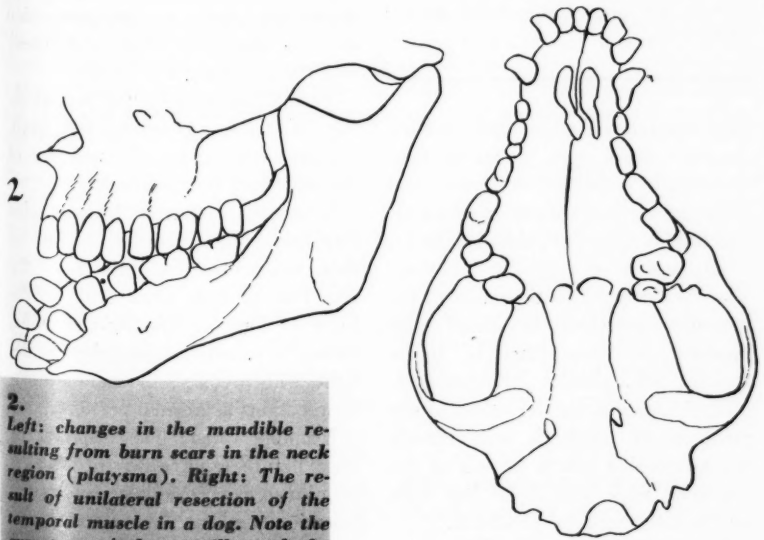
From the first crying and sucking movements at birth until the facial muscles finally settle into the rigor mortis, the human organism is subject to a constant stream of emotions and sensations which co-exist in a specific relationship with certain definite patterns of the facial musculature.

Definition — This unremitting stream of feeling will be designated as the *emotional tonus* of the organism. For purposes of clarity, it can be divided into an inherited moiety which can be called *temperament* and an acquired moiety which is *character*. The result produced by the emotional tonus (that is temperament plus character) is the *personality* of the individual.

Muscular Changes—The emotional tonus always produces certain specific muscular changes. These were classified by Darwin in his work "The Expression of the Emotions," in which he postulated three laws which govern the relationship between the emotions and the musculature[2] (Fig. 1).

1. *The Principle of Serviceable Associated Habits* — Certain complex muscular actions are of direct or indirect service to the organism under certain states of mind, and whenever that state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least usefulness.

Indignation: The application of this law may be illustrated in the emotion of indignation. This produces the following muscular reactions: head pulled erect, shoulders squared, chest expanded, fists clenched, a frown, and the mouth closed tightly. These are all serviceable movements in that they produce a formidable mien designed to intimidate an ad-

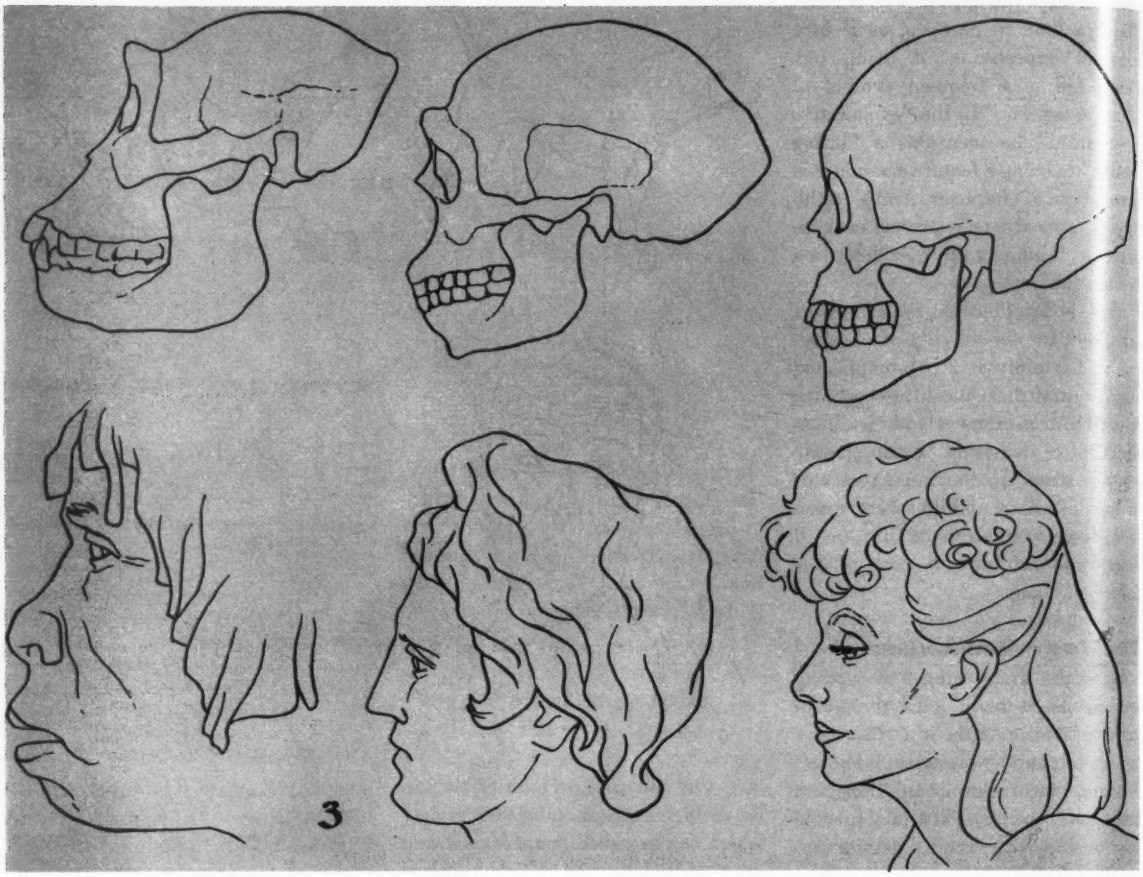


2.
Left: changes in the mandible resulting from burn scars in the neck region (platysma). Right: The result of unilateral resection of the temporal muscle in a dog. Note the curvature of the maxilla and the malformation of the dental arch.

[1]Fromm, Erich, Man For Himself, New York, Rinehart & Company, 1947, p. 63.

[2]Darwin, Charles: The Expression of the Emotions in Man and Animals, London, Watts and Company, 1934.

[3]Thompson, J.: Development of Facial Expression of Emotion in Blind and Seeing Children, Arch. Psychol., **264**:1-47 1941.



3.
The bony skull of ape, primitive man, and modern man; the facial profile of Piltdown man, ancient Greek man, and modern man. These changes occurred in fifty thousand years and can only be accounted for on the basis of an alteration in the tonus of the facial musculature.

versary, and they prepare the organism for battle. They are always present when indignation is felt, even though there be no adversary.

The Snarl: This is another simple illustration of this principle. Snarling bares the canine tooth which serves to frighten the enemy and also removes the lip from interference with any biting action.

2. *The Principle of Antithesis* — Certain states of mind produce certain concomitant muscular reactions which are of service to the organism. When a directly opposite state of mind is introduced there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these be of no usefulness.

Emotion of Helplessness: To illustrate the action of this law refer to the previous example of indignation and observe the muscular actions which accompany its opposite emotion of helplessness: The head bent down (not erect), shoulders shrugged (not squared), chest relaxed (not expanded), hand open, palms up (not clenched in a fist, palms down), eyebrows raised (not lowered in a frown), and mouth open (not closed tightly).

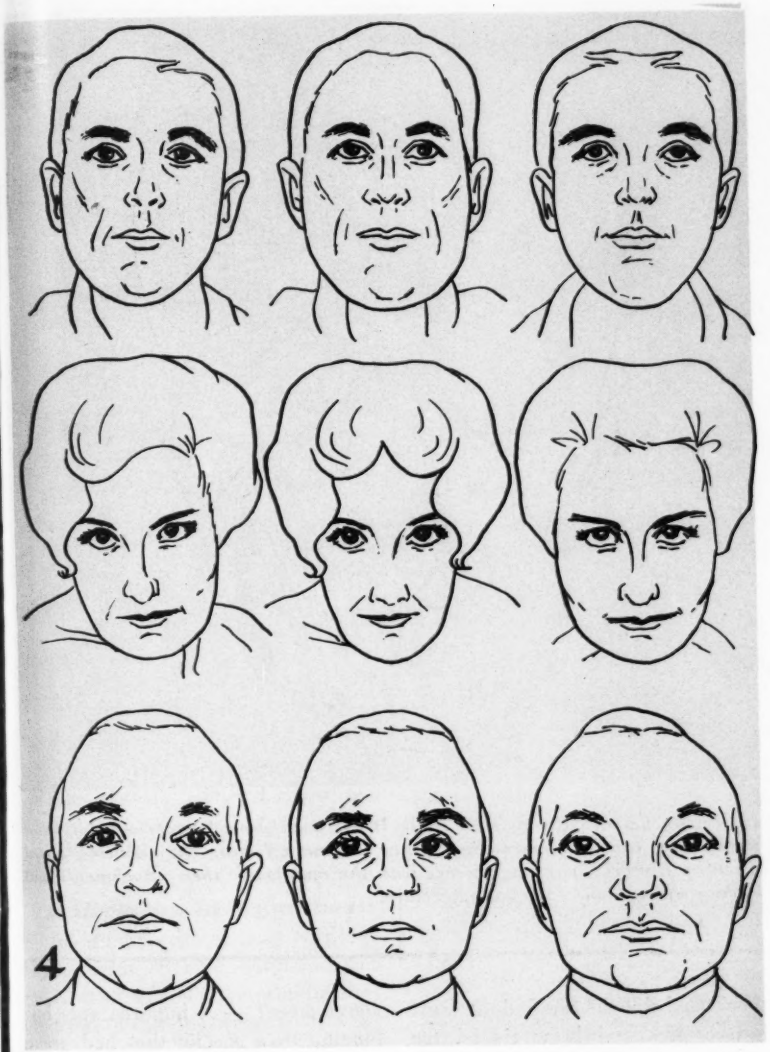
Expression of Opposite Emotion: The obviously antithetic nature of the muscular reactions associated with opposite emotions (that is, smile-frown; pride-shame; arrogance-humility) demonstrate the action of the principle of antithesis even though the serviceable nature of one of the reactions may have been lost ages ago in the course of evolution.

3. *The Principle of the Direct Action of the Nervous System*—When the sensorium is strongly excited in a manner that does not produce muscular action of the first two types, or to a degree that is beyond their capacity to absorb, the emotion is expressed muscularly in certain ways depending partly on the connection of the nerve cells (that is, reflexes) and partly on acquired habit.

Trembling, jumping for joy, writhing in agony, gnashing the teeth, clapping hands, are all examples of the action of this principle.

Inherited Patterns: Darwin also established the inherited nature of these neuromuscular patterns by the fact that persons born without the sense of sight or hearing can smile, frown, cry, express surprise or delight, with precisely the same muscular reactions as normal persons.

Example Cited: The behavior of dogs before lying down to sleep is mentioned as an example of inherited behavior patterns. The general pattern of their behavior suggests that they are trampling down the grass to



4.
(After Wolf) Illustrating the different expressions of character obtained by combining right-half and left-half photographs. In each case the tracing at the left is the full face, the middle tracing is obtained by combining two right halves, and the right hand tracing is obtained by combining two left halves. The psychiatric case histories of these three subjects show that the social or overt personality is expressed in the right face, which the asocial or covert personality is expressed in the left face.

prepare a bed for themselves. This neuromuscular pattern is found in all dogs except Eskimo dogs. In their case, after hundreds or thousands of generations of living in the arctic snows, evolution and natural selection have had sufficient time to discard the now purposeless reaction.

Inherited in Quantitative Sense: If the inherent nature of these responses is admitted it must be conceded that they must be inherited in a quantitative sense for it would be a logical absurdity to inherit a trait qualitatively and not quantitatively. From this it may be concluded that with the passage of time and the operation of natural selection, various neuromuscular patterns would be inherited in different degrees in the various races of man.

The Musculature and Dentofacial Development

To begin with an extreme example a case may be considered where burns in the neck region produced scar tissue which exerted a constant pull approximating the action of the platysma muscle. (This force would also be present in a chronic state of fright.) The resultant shape of the mandible clearly illustrates the effect of this tension on the physiognomy (Fig. 2).

Removal of Masseter Muscle—In a series of experiments the masseter muscle was removed unilaterally in baby rats. Suitable control groups were used. The results: "malocclusion of the teeth . . . due to remodeling of the mandible on the operated side . . . warping of the body of the mandible in an inferior and lateral direction . . . open bite and cross bite in the dental occlusion of the masseter-ectomized animals."[4]

Effects of Cerebral Palsy—Several studies made on the influence of cerebral palsy on dentofacial development contribute to an appreciation of the relationship between muscle forces and resultant structure. The abnormal muscle forces encountered in many cases of cerebral palsy were shown to have produced abnormal patterns of tooth eruption, occlusion, and bone structure.[5]

Typical Patterns in Various Conditions — Several investigators have noted the typical patterns of dentofacial development associated with cretinism and idiocy.[6] There have also been innumerable studies made of the effect of muscle habits in orthodontics,[7] periodontal disease,[8] occlusal malfunction,[9] and prosthodontics.[10] Many of these, in addition to cataloguing the changes in dentofacial structure brought about by the abnormal muscle habits, stress the es-

[4]Horowitz, S., and Shapiro, H.: Alveolar Bone Changes Following Alteration of Masticatory Function in the Rat, J. of Periodontal. **25**:65-66 (Jan.) 1954.
[5]Lyons, D. C.: Influence of Cerebral Palsy on Dentofacial Development, J. Pediat. **49**:432 (Oct.) 1956.
[6]Thoreck, Max: The Face in Health and Disease, Philadelphia, F. A. David Co., 1946.
[7]Klein, E.: Pressure Habits, Etiologic Factors in Malocclusion, Am. J. Ortho. **38**:586 (Aug.) 1952.
[8]Leof, M.: Clamping and Grinding Habits; Their Relation to Periodontal Disease, JADA **31**:184-194.
[9]Tully, W. J.: Adverse Muscle Forces—Their Diagnostic Significance, Am. J. Ortho. **42**:801-814 (Nov.) 1956.
[10]Bloch, L.: Muscular Tensions in Denture Construction, J. Pros. D. **2**:198-203 (March) 1952.

sentially emotional nature of these habits.[11]

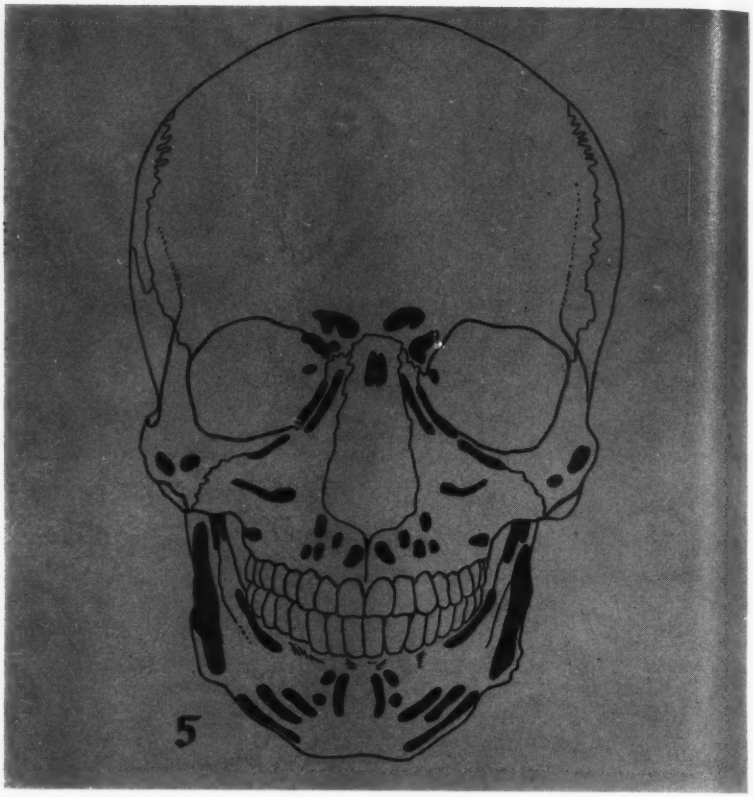
Evidence from Anthropologic Study —The most definitive evidence concerning the effect of muscle tonus on the development of the human face can be found in the field of anthropology. Libby, using Carbon 14 dating, revised the time-table of human evolution drastically. The ages he determined for various fossils were undoubtedly accurate, but they raised a question in evolution. How could the transition from the underslung jaw and beetling brow of Piltdown man have been made in only fifty thousand years?[12] (Fig. 3).

Earlier Estimates of Age — Previously, partly because of the tremendous anatomic differences between prehistoric skulls and that of modern man, various estimates of their age had ranged from five hundred thousand to a million years.

Dilemma Expressed — Washburn summed up the problem in these words: "The situation has been called a statistical and mathematical absurdity. If each one of the differences between the ape-man and ourselves is based upon a separate element of genetic construction of the individual, it becomes mathematically impossible to change ape-man into modern men in the time that seems to be implied in the actual record."

Hypothesis to Account for Change in Skull—In an effort to provide a scientific solution to this dilemma, Washburn coincidentally went back to an assertion of Darwin for his starting point. Darwin has hypothesized that the musculature could affect the form of the brain case. Washburn's hypothesis was that perhaps the complete change in the skull from ape-man to modern man could be accounted for by one change in muscle tonus.

Experiments Conducted—To obtain experimental proof for this hypothesis, Washburn severed the jaw muscles on one side of the skull of newborn rats. When they were later sacrificed it was found that on the unoperated side the rats had the usual deep creases and brow ridges, the same kind of ridges and creases found on the skulls of the Neanderthal and Piltdown man. On the operated side the skulls were smooth like the skull of modern man.



5.
Muscle attachments of the facial skull. It has been proved experimentally that entire bones can be removed in infancy without affecting the resulting facial structure. However, any interference with the muscles or their attachments will produce a distortion of the bone structure.

Bones Removed from Facial Skeleton — A series of experiments was performed in which bones and portions of bones of the facial skeleton were removed, leaving the musculature intact. It was found that it made little difference what was done to the bone. Adjacent bones would grow back and fill in. Removal of large sections of bone in the newborn animal made no difference in the shape and form of the adult facial structure. But the slightest alteration in the musculature made a dramatic difference.

Morphologic Evidence of Relationship Between Muscles and Dentofacial Development — A hundred apes belonging to a species that had great variation in skull ridges were dissected in their natural habitat. A definite relationship was established between the weight of the jaw musculature and the formation of the skull: (1) If the muscles weighed 10-12 grams the skull was always smooth. (2) If the muscles weighed 32-33 grams the skulls were always markedly creased and ridged. (3) The weights in between were found consistent with these findings. (4) It was found that the heavier musculature produced uniform and predictable changes in the form of the nose, the eyes, and the cheek.[13]

From ape-man to modern man, there has been a decrease in the size of the facial features. The jaw has

[11]Garn, B. J.: Chronic Tensions in the Skeletal Musculature and Their Relation to Dental Disease, DENTAL DIGEST **58**:262-265 (June) 1952.
[12]Libby, W. F.: Radiocarbon Dating, Chicago, Univ. of Chicago Press, 1952.
[13]Washburn, S. L.: The New Physical Anthropology. Trans. of the N.Y. Academy of Sciences. Series 2, Vol. 13, No. 7. 298-304.

become less underslung, the eyebrows less beetling, the nose not so broad. Any and all of these changes can only be reasonably explained, within the limits of the time factor by an alteration in the muscle tension.

Criterion of Symmetry—Two other facts which indicate clearly the neuromuscular role in facial development can be found in the work of Sir Arthur Keith and that of Wolf. The former established the criterion of symmetry in determining the authenticity of primitive skulls. He showed that the skulls of apes and ape-men are invariably symmetrical; whereas any trace of asymmetry is a sure indication that the skull in question is that of modern man.[14]

Facial Laterality and Personality—Wolf studied the relationship between facial laterality of the human face and personality. His complete photographs demonstrate not only the laterality of the human face, but the fact that the features of the right face express the overt or social personality of the person, while the left face shows the repressed or asocial personality[15] (Fig. 4).

Verification of Hypothesis

All of the foregoing must be viewed in the light of three additional facts which tend to add circumstantial verification to this hypothesis:

(1) Darwin observed that the differences between the skull structure of the infant man and ape are slight, whereas the differences are quite marked in the full grown man of the species. This fact argues for the importance of development rather than heredity as the primary factor in producing dentofacial structure.

(2) While the facial skull increases in size twelve-fold from birth to maturity, its rate of growth is far from constant. From birth to two years it grows rapidly, and again during adolescence. At all other periods the rate of growth is extremely slow. If the emotions indeed do affect dentofacial development, as we suppose, this fact would augment the effect because the periods of most rapid facial growth coincide exactly with the periods of most intense and important psychic development[16] (Fig. 5).

(3) The anatomy of the skull must be examined with particular regard to its muscle attachments. In consideration of (1) the fact that there are more than *fifty* direct muscle attachments to the facial skull in addition to indirect attachments such as the tongue muscles and parts of the lips; (2) that muscle force and not bones produce the final form of the facial skull, and (3) that all of these muscles work continually in response to the emotional patterns of the subject (Table 1), the definite relationship between the emotions and dentofacial development must become apparent.

(End of First Installment)

745 *Fifth Avenue*

TABLE 1

Facial Reactions Associated With Emotional States (after Darwin)

Emotion	Facial Concomitant
Joy	Corner of mouth drawn up and back
High Spirits	Round face (rosy)
Love	Cheeks raised (bright-eyed)
Tenderness	Upper lip shortened
Devotion	Upper teeth exposed
Grief	Corner of mouth pulled down
Dejection	Long face (pale)
Despair	Cheeks sunken
Low Spirits	Upper lip long
Sympathy	Lower teeth exposed
Anxiety	Mandible sinks down
Suffering	Mouth opened—lips retracted
Weeping	Bruxism
Reflection (Meditation)	Corrugation of eyebrows and forehead
Ill-temper	Lips compressed tightly
Determination	Teeth clenched
Sullenness (Sulkiness)	Nostrils dilated
Obstinacy	Facial musculature taut
Hatred and Anger	Platysma contracted
Sneering	One side of mouth raised—head averted
Derision	Both sides of mouth raised—head back
Disdain	Head back—nose turned up
Contempt	Lips pursed—upper lip curled
Disgust	Nostrils contracted—eyes look down
Guilt	Converse movements of eyes and head
Suspicion	(Head down—eyes up; head right—
Slyness	eyes left, etc.)
Haughtiness	Lower lip everted (musculus superbus)
Pride	Head up and back
Helplessness	Mouth open—shoulders shrugged
Attention	Eyebrows raised
Surprise	Eyes opened wide
Astonishment	Mouth open
Amazement	Lips protruded
Fear	Dry mouth—cold sweat
Terror	Trembling—goose bumps
Horror	Gasping movement of protruding lips
Shame	Hang-down head—eyes to ground
Shyness	Grimaces
Modesty	Lip-biting

[14]Keith, Sir Arthur: The Antiquity of Man, Philadelphia, J. B. Lippincott Company, 1929.
[15]Wolf, W.: The Right and Left Face, Ciba Symposia (Feb.) 1942. pp. 1136-38.
[16]Morris-Jackson: Human Anatomy, Philadelphia, The Blakiston Company, 1933, pp. 33-34.

PERIODONTAL DISEASE

as Viewed by the French Stomatologists

IRVING A. GERBER, A.B., D.D.S., New York

DIGEST

As a review of an aspect of dental research and an explanation of an experiment in diagnosis and therapeutics this article serves a definite and important purpose.

Systemic Factors in Peridontal Disease

It is generally accepted in the dental profession that there is need for continued research in the etiology and treatment of periodontal disease. This applies in particular to the search for systemic factors which influence the cause and the course of this widely prevalent condition.

Progress in Local Therapy—Instrumentation, hygiene, and periodontal surgery have rendered mouths free of infection for long periods. Some cases, however, show indifferent results, apparently not due to lack of skill on the part of the periodontist, or lack of cooperation by the patient. The general practitioner, whose every restoration depends upon the good health of the periodontium, can find little comfort in the confusion.

Vaccine in Medical Practice—Renewed interest has developed in the use of vaccine in medical practice. It has again proved to be a potent force in the mass protection against disease. As a therapeutic measure, the use of vaccine has been in a decline since the advent of chemotherapy and antibiosis. But the latter agents have failed, it would seem, to combat chronic and subacute infection. Periodontal disease, in some of its forms may well come under this classification.

Theories of Treatment

Many theories of etiology and treatment have been propounded; many have been explored. Some have been neither corroborated nor exploded, but merely ignored. In fact, treated with sanctimonious disregard.

Theories Disregarded—This seems to have been the fate of the brilliant results of René Vincent of the Stomatological Institute, Faculty of Medicine of Paris (France). His thesis, formulated in 1927, published in 1932, received the Magitot Prize of the Academy of Medicine. The work was considered a highly significant step in the concept of the systemic causation of periodontal disease. His diagnostic concepts gained much acceptance among the stomatologists and gastroenterologists of France, Belgium, and Switzerland. In the United States, over the past twenty years, not one reference has been made to his theories. B. G. Bibby, in a provocative article in 1957, in which he reviews the history of vaccinotherapy in dentistry, does not mention Vincent's contribution.

Delicate and Complicated Technique—Vincent's concept of the systemic origin of eighty per cent of the cases of inflammatory periodontal disease is at odds with present American opinion. His claims do not account for all the cases observed, nor does he minimize the concrete value of local treatment. His technique is not simple. It requires a precise and delicate procedure. It demands extreme patience and a detailed medical history. It necessitates the cooperation of the general medical practitioner and often the services of the bacteriologist and gastroenterologist.

Basic Theory

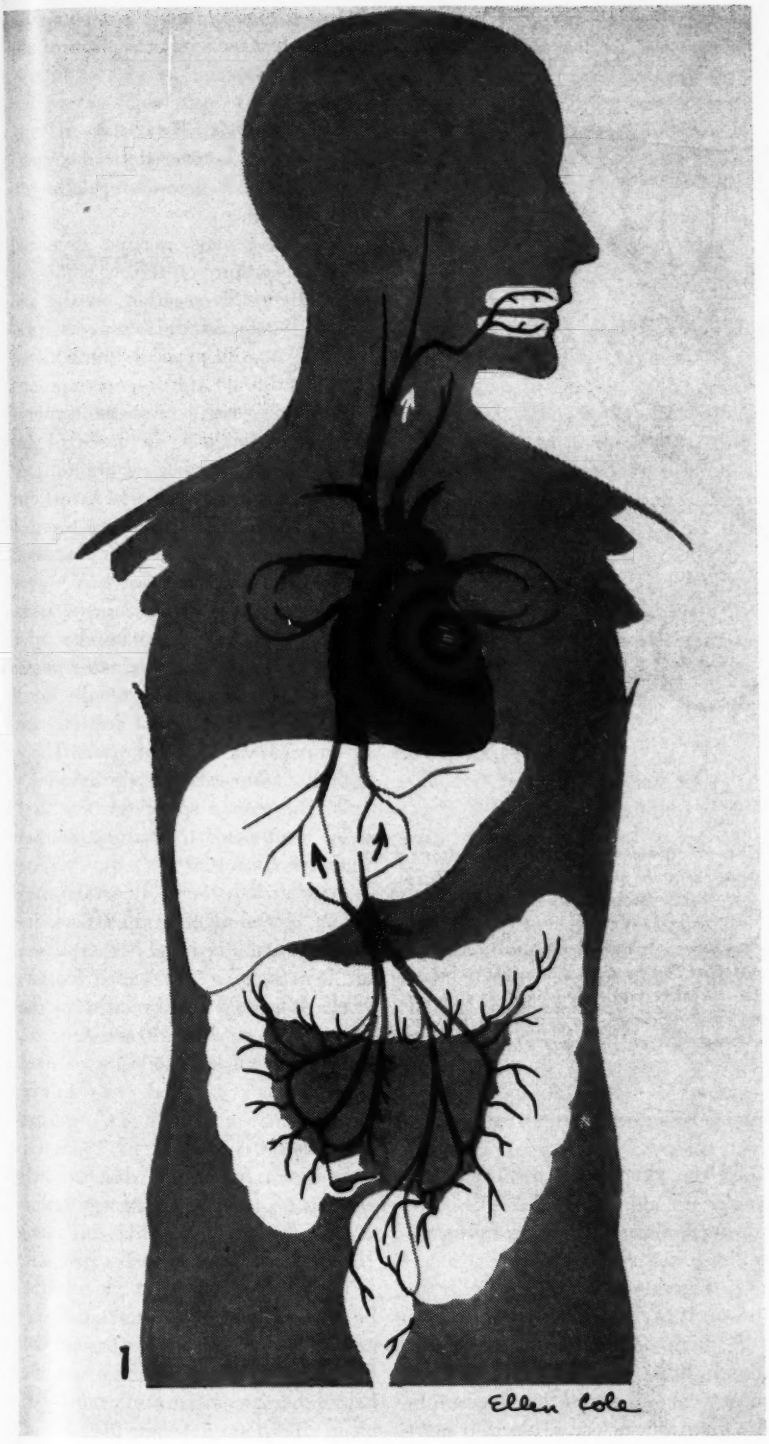
Nomenclature — Polyalveolysis describes the forms of periodontal disease in which there is involvment of the periodontium and rarefaction of the alveolar bone.

Classification—1. Inflammatory: The gingival tissue is swollen and congested. It shows all the classical signs of inflammation. Suppuration is present in greater or lesser degree. The tissue bleeds at the slightest touch.

2. Ischemic: The gingiva is pale and anemic. Pocket formation is extensive. Suppuration is absent. Puncture produces slight bleeding.

3. Mixed: This can be a late terminal form of the ischemic type or the coexistence of both types in the same case. Suppuration and inflammation are present. Pocket formation is extensive.

Etiology—Polyalveolysis in its inflammatory form is a local manifestation at the level of the gingiva, of a systemic pathologic condition of an infectious nature. Congestion of the gingival tissues is caused by a swarming of bacteria, by way of the blood stream from a distant focus most often located in the digestive tract. Continued hyperemia and stasis of the circulation in the gingival tissues, leads to rarefaction of the alveolar bone. The organisms most often encountered are streptococci and sometimes staphylococci, and occasionally *B. Coli.*



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The Inflammatory Form—Vincent's Theory

The affinity of specific tissues for the attraction of microorganisms is medically recognized if not fully understood. The intestine supports the passage of bacteria through its walls. In the presence of enteritis the permeability of the intestinal mucous membrane is increased. The presence of a low-grade bacteremia is difficult to demonstrate by ordinary blood examination.

Sites of Infection—Rarefaction of bone persistent over a period of time is sufficient evidence that a disease process is going on. Otherwise the area would become smaller and be replaced by new bone. Postoperative smears, cultures, and tissue examination strongly support the view that these rarefied areas are active sites of infection.

Correlation Between Intestinal Disease and Inflammatory Polyalveolysis—The investigation of more than three thousand cases revealed that prior to or concurrent with the gingival infection, despite the apparent health of the subject, a detailed history showed recent or past disease of an infectious nature. Disorders of the intestinal tract predominate in these histories. They take the form of enteritis, colitis, chronic appendicitis, spastic colon, gastric ulceration, and hepatic insufficiency. Most often the routine examination of blood, urine, feces fails to reveal the causative organism. Gastroenterologists have noted the constancy of the correlation between intestinal disease and inflammatory polyalveolysis.

Experimental Proof

A blood culture taken directly from the gingival tissues (gingival hemoculture) reveals one strain of an organism, which upon growth produces a pure culture. A subclinical bacteremia, undetectable by any other means, may be discovered by this method.

Choice of Site for Aspiration—This is of great importance in making a gingival hemoculture. It must be made at the center of the base of a triangle of which the slightly inflamed papilla is the apex. In a highly con-

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A blood culture taken directly from the gingival tissue (gingival hemoculture) reveals one strain of an organism, which upon growth produces a pure culture. A subclinical bacteremia, undetectable by any other means, may be discovered by this method.

The choice of the site for aspiration in making a gingival hemoculture is of great importance. It must be made at the center of the base of a triangle of which the slightly inflamed papilla is the apex. In a highly congested case, it is often difficult to find an appropriate site. The presence of deeply suppurating pockets complicates the aspiration. A suitable area is one which presents blanching and slight bleeding upon pressure.

gested case, it is often difficult to find an appropriate site.

Complications — The presence of deeply suppurating pockets complicates the aspiration. A suitable area is one which presents blanching and slight bleeding upon pressure.

Procedure—The following steps are taken:

1. The region is prepared by blocking off with cotton rolls, swabbing twice with alcohol, and drying with warm air.

2. The aspiration is made with a Pasteur pipette with a tip diameter of 1.5 millimeter having a sharp point. It is fitted with a rubber mouth tube.

3. The puncture is made at right angles to the gingival tissue. The pipette is thrust deeply, withdrawn 1 milimeter.

4. The blood will flow into the lumen of the tube.

5. Slight aspiration through the mouth tube is sometimes necessary to prevent leakage of the blood on to the gingival surface. This step must be executed with extreme care.

Deep Tissue Aspiration—It is important that the blood be taken from deep within the tissue. Aspiration from the surface of the gingiva or from within a pocket will produce a culture contaminated by the saprophytic organisms of the flora of the mouth. None of these is responsible for the bacterial inflammation of the gingival tissue.

Therapeutic Method

The blood recovered from a careful aspiration is grown on gelatin culture medium.

An autogenous vaccine prepared from this culture on testing will show a positive skin reaction on the patient. When administered as prescribed it will produce diminution, amelioration of the local symptoms, and improvement in the general health, particularly in cases of intestinal disorders.

Routine Procedure—The growth of the culture and the preparation of the autogenous vaccine follow routine bacteriologic practice:

1. Two series of six subcutaneous injections are employed. The first series is started with ¼ cubic centimeter and increased gradually to 1 cubic centimeter. Two injections are given per week for three weeks. There is then a two-week waiting period.

2. The second series starts with 1 cubic centimeter, one injection per week for six weeks.

Possible Reactions—Reactions may be an elevation of temperature, intestinal upset, diarrhea. In these cases, the injections are suspended for one week. It should not be used in the presence of cardiac disease, tuberculosis, or in suspected kidney or liver disorders.

Discussion

It is not imperative that in each case to be treated a gingival hemoculture be taken. Nor is the autogenous vaccine absolutely essential. It is not mandatory that the vaccine be administered by injection. Vincent states that this means has proved the most efficatious because specific bacteritherapy is the preferred treatment. He does not bar the use of the polyvalent stock vaccine provided the original strains were recovered by means of gingival hemoculture, and are made with multiple organisms including a wide range of streptococci and staphylococci. When the stock vaccine is used and the focus of infection cannot be eliminated sur-

gically (as in cases of chronic colitis) great perseverance must be brought to bear to continue the vaccine for sufficient time to show results. In many cases in which the patient is being treated by the physician for infectious states of a subacute or chronic nature, the administration of the vaccine produces improvement of the infectious process.

Oral administration of the vaccine is not prohibited. Good results have been obtained if the vaccine is sufficiently potent and is administered in large doses.

274 *Madison Avenue*

Fainting

A WIDE variety of conditions may precipitate fainting. It may occur after prolonged standing in the erect posture, sympathectomy, violent coughing, or the administration of ganglion-blocking drugs and nitrites, and it may be a complication of hemorrhage or pregnancy. Arterial hypotension is a constant feature of it. Now it has been demonstrated that severe hypotension is not uncommonly precipitated by fear before the administration of nitrous oxide for dental extraction. Nausea caused by apomorphine was also found to lead to a similar vascular reaction.

Imbalance in Vascular Reactions—Since arterial pressure is a product of total peripheral resistance and cardiac output, it follows that acute hypotension is due to a profound fall in one or both of these factors. The normal slight fall in venous filling pressure and cardiac output which occurs with a change in the upright posture in man is balanced by vasoconstriction; this "baroceptor constriction" has been observed in the vascular reactions accompanying squatting and performing the Valsalva maneuver. Fainting occurs when normal vascular reactions are inadequate and fail to maintain arterial pressure above some 50 millimeters mercury.

Possible Reflex Problem—The constituents of the faint reaction, apart from the hypotension and resulting syncope, are independent of the cause, and include sudden bradycardia, pallor, sweating, and hyperpnoea, suggesting that the whole is a reflex phenomenon. Sudden vasodilatation, as shown by an increase of blood flow in the forearm, has been observed in fainting reactions accompanying hemorrhage, tilting to the upright posture, spinal anesthesia, and pregnancy. Thus fainting will be enhanced in susceptible subjects by any factors which tend to increase vasodilatation, such as a warm atmosphere or thick clothing.

Factors Involved

In most types of fainting there is evidence that inadequate filling of the heart, and consequently a reduced output and lower pulse pressure, is a crucial factor. The inadequate filling is due to venous pooling, which is why fainting is usually associated with the erect posture and is more likely to occur when the subject is in the lorotic position or has been standing for long. In pregnancy venous pooling is probably due to partial occlusion of the inferior vena cava by pressure of the gravid uterus.

Possible Stimulation of Afferent Nerves — Nitrites readily produce faintness because they cause venous dilatation as well as arteriolar relaxation. Venous pooling may be stopped by an antigravity suit, which thus prevents syncope. Diminishing filling of the right atrium is also an important factor in the mechanism of cough syncope. It is suggested that the whole faint reflex may be initiated from afferent nerves stimulated by a relatively empty heart, thus being caused not only by venous pooling but by vigorous systolic emptying owing to emotional stimulation. This ingenious hypothesis explains the strange absence of faint reactions in patients with congestive heart failure, when a residue of blood remains in the ventricles in diastole.

Central Paralysis of Vascontriction—In a rare form of idiopathic postural hypotension there is syncope on standing, anhidrosis, and impotence. These are the results of a central paralysis of vasoconstriction, and the effect is similar to that caused by extensive sympathectomy or an overdose of ganglion-blocking drugs. In these conditions syncope may occur before the full picture of vasovagal fainting develops; unconsciousness may supervene without bradycardia. It has been shown, however, that, apart from minor differences in degree of vascular reaction, in all forms of fainting the final mechanism is similar. There is sudden vasomotor failure in conjunction with reduced filling of the heart. The only homeostatic feature of the reaction appears to be final collapse from the upright position, which leads to restoration of the venous filling pressure.

Adapted from *British Medical Journal* No. **5101**:899 (Oct. 11) 1958.

Simplified Procedure

for IMMEDIATE DENTURES – Part Two

JOSEPH STEWART FROST, D.D.S., Pittsburgh, Pennsylvania

DIGEST

In this installment which is the second of a two-part article, the author describes the step-by-step directions for the relining technique which is an important feature in the success of this immediate denture procedure.

Processing of Dentures

If the waxed-up case is sent to a commercial laboratory for processing, a postdam will be added and the flanges made far too thick. The case will then need to be cut down before insertion. In addition, the laboratory will not be able to make the chairside cold cure acrylic relines upon which the success of the entire operation depends.

Equipment Required for Processing—With the present day materials regular processing is not difficult. The usual equipment is needed: flasks, bench compress, heater, thermometer, and lathe. Following a routine half flask using (Ransom and Randolph's Boilsoft Flasking Material) color coded, pink, a separating liquid (Brophy's Separatine), is painted on the lower half of the flask.

Flasking Process—1. The case is full flasked at once.

2. After a setting time of one hour the flask may be heated to soften the wax and is separated.

3. The boilout of the wax is expedited by the use of one of the new detergents or a wax solvent (Justi's Wax Solvent No. 20).

4. When wax free the rough cast is smoothed with a knife to remove the saw tooth irregularities.

5. The case is processed in accordance with the manufacturer's instructions.

Best Materials Used—An electric automatic curing oven is helpful as the cases may be cured over night. Use only the finest quality acrylic materials available; they are completely color stable and do not warp.

Special Treatment Applied—After removal from the cooling flask the denture is trimmed and pumiced. Before the polishing a special treatment is applied to the upper posterior flanges: (1) The undercuts are trimmed away, the flanges are then cut away in addition to allow for a space of one half millimeter between the acrylic and the healing mouth tissue. (2) The denture flange is loose fitting until the first reline later. (3) All surface irregularities that contact tissue are removed. This trimming eliminates most postoperative pain.

Lasting Polish Obtained—With the new and harder acrylics a jeweler's rouge may be used instead of the conventional powders or whiting (Marvel Plate Polish). After the preliminary polish the denture may be given a hard mirror-like finish with the additional use of a liquid polish (Junior High Polish). This maintains the glossy finish for years. The denture is placed in a water bath until it is delivered to the patient.

Procedure

1. The teeth are extracted and the alveolar process is trimmed to the depth indicated.

2. With modern surgery complications are reduced to a minimum. The dentures are inserted, as planned, at the time of the extraction or within a period of twelve hours afterward. A denture adhesive should be used.

3. The patient is advised to eat soft foods and not to remove the denture. It will remain in place until the dentist removes it four days later, unless otherwise instructed.

Postoperative Measures

1. The patient may return to his employment on the first or second day after the insertion of dentures. The stickiness of the freshly clotting blood and the usual mild swelling will hold the denture comfortably in place.

2. When the patient returns the operator will gently remove the dentures and wash them. The mouth is irrigated with warm water. An antiseptic may be applied.

3. The sutures are not removed until the following week.

4. The patient is instructed in the use of the various adherent powders and pastes available, without which immediate dentures could not be made.

5. The patient may remove the denture for cleaning as desired, or it may remain in place until the next appointment when the dentist may again clean it.

Adjustment Facilitated—Speaking presents no problem, the general position of the natural teeth has not been changed. There are no new habits to acquire. The patient is dismiss-

24.
Untouched upper cast after boilout, before trimming. Note ragged surface of ridge.

25.
Upper cast is trimmed with knife to smooth out saw tooth irregularities, examined for rough surfaces, which are filled in, patched up, or otherwise removed.

ed with an appointment for four to seven days later.

Additional Measures—During the second appointment after the insertion of the dentures spot grinding may be indicated, and sutures may be removed. Adjustment for pain is rarely needed due to the preinsertion treatment of the flanges. The patient is instructed in the daily care of the teeth. The dentures will remain in the mouth at all times except when removed for cleaning. The patient is told to return in six weeks for the first reline.

Reline Procedure

The dentures are usually relined at different times, a week apart, the upper first. The following steps are taken:

1. The dentures are removed. The one not to be relined is cleaned, wrapped in tissue, and set aside during the appointment.

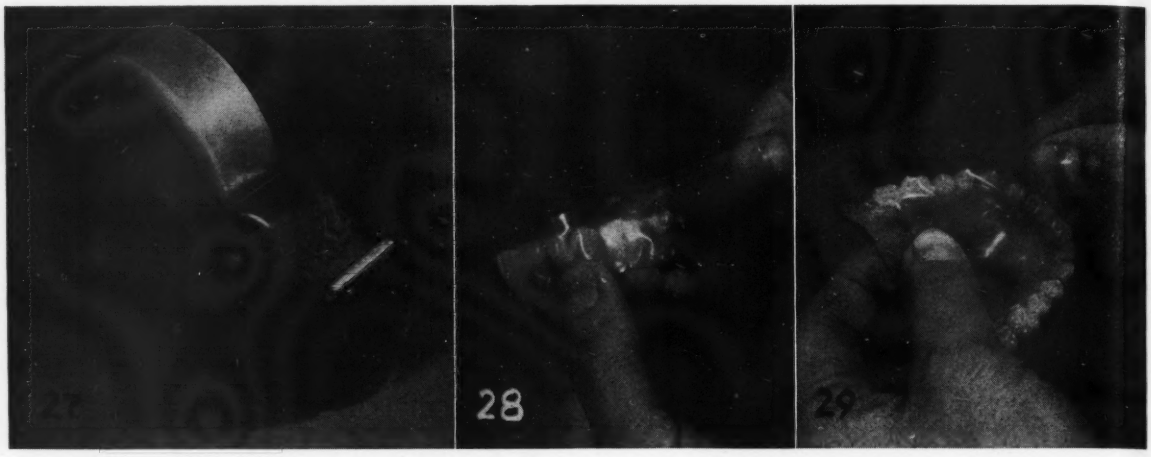
2. The denture to be relined is cleaned with a coarse pumice type cleaner. Special care is given to the tissue-contacting surface.

3. Dry with cleansing tissues and compressed air. With a coarse acrylic trimmer roughen the periphery only which is quite thin at the flanges; do not touch the polished surfaces. Rinse again and complete the drying with alcohol applied with small applicator.

4. When dry, attach cellophane tape to entire outside polished surface to prevent the new cold cure acrylic from sticking to it. This will protect the surface and eliminate the need for polishing the entire denture again. The tissue-contacting area is left untouched and dry.

5. Place the patient upright in the chair to prevent the drippy materials from running back into the throat. Rinse mouth with tap water to remove thick saliva and air bubbles. Use paper towels as it is impossible to remove hardened acrylic from linen towels. The operator's fingers are lubricated with a high grease content hand cream to prevent fresh acrylic from sticking to them as it is extremely difficult to remove from dry hands.

26.
Special treatment for flanges. After removal of gross undercuts, using a coarse acrylic trimmer (C C Trimmer), cut away one millimeter of the tissue-contacting area of the posterior flanges. This simple operation eliminates most of the post-operative pain by removing the potential pressure areas and cannot be omitted.



6. Use a cold cure acrylic of the same manufacture as the original material. For example, if using Caulk's Lucitone for the original, use Caulk's Nu-Weld for the reline. It is completely compatible. Mix strictly according to the manufacturer's instructions. Mix to a molasses consistency. The mix should be quite thin and drippy, flowing to place with virtually no resistance, and is held in place by the thin margin of the denture flange itself, plus the limiting effect of the surrounding cellophane tape, which has been trimmed to the edge of the denture. The tissues will not be displaced, this procedure is as near pressureless as possible.

7. Apply the reline material to the ridge areas only, not to the palate. Add a slight postdam. Place in the mouth at once with a firm pressure so that the excess will flow up and over the edge of the denture like water with no air bubbles entrapped.

27.
The reline procedure. Cellophane tape ¾-inch wide is used to cover and protect the previously polished palatal and buccal surfaces.

28.
Transparent tape is applied to the polished flange areas prior to the reline application.

29.
Transparent tape is applied to the palatal areas before the reline procedure.

30.
Mixing jar and spatula (curved) for the cold cure acrylic reline.

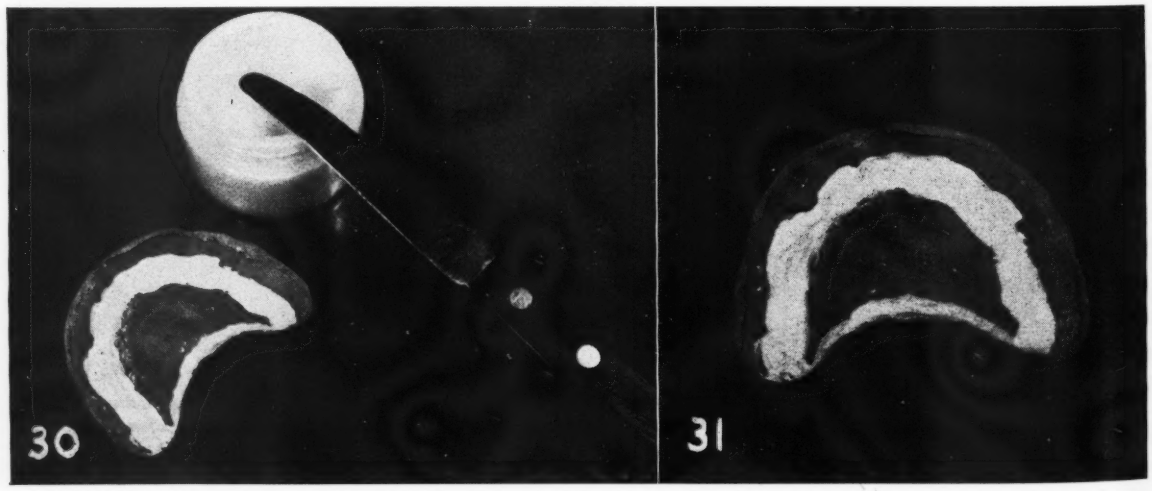
31.
Application of the cold cure acrylic reline material to the denture. (In the illustration it is colored white for contrast). Actually the color is the same as the denture and no finish line is apparent. A postdam is used here for the first time. Peripheral pressure is increased, central pressure is reduced on upper dentures. Subsequent relines use the same procedure, with little new acrylic material added.

8. Hold in place for three minutes, remove, and trim off excess with scissors. Reinsert at once and hold for four more minutes or until the excess plastic remaining in the mixing jar loses its tackiness and becomes stiff to the touch or the plastic in the mouth becomes brittle. The previous room storage temperature has an effect on setting time; in warm weather the plastic will set faster.

9. Rinse the denture in tap water to remove saliva and set aside for twenty minutes to harden. When the reline material is hard, remove the tape by peeling it off and polish the peripheral edge of the denture. If the reline operation is properly done this polishing takes but a short time and the original polish will not be disturbed.

10. Reseat the patient in chair.

(*Continued on page* 411)



FIXED PORCELAIN RESTORATION

After Alveoplasty

1.
Appearance marred by protruding incisors overlapping lower lip.
2.
Upper lip slightly puffed out, chin cleft accentuated.
3.
Extreme anterior overjet. Overbite is relatively normal.

DIGEST

Surgical reduction of the anterior segment of a protruding maxilla with subsequent fixed restoration of the incisors is often complicated by an excessively high lip line. In the case described here periodontal involvement of the maxillary incisors required their extraction. In order to improve function and appearance, the maxilla was reduced. Normal pontic construction would have resulted in excessively long teeth with extensive display of gingival tissue and interproximal spaces during speaking and smiling. By utilizing pink porcelain in the saddle area and tooth porcelain for the teeth (Permadent®), a fixed prosthetic restoration was satisfactory esthetically and functionally.

JAY W. FRIEDMAN, D.D.S., Seattle

4.
Postextraction view before alveoplasty.
5.
Anterior segment of maxilla reduced by alveoplasty.

6 and 7.
Inexpensive immediate temporary claspless partial denture satisfactorily restoring appearance during healing.

8 and 9.
Adaptation of labial denture flange over surgical wound.

10 and 11.
Fully healed alveolar ridge two months after surgery, showing extent of surgical reduction of maxilla.

Procedural Steps Illustrated

The following steps were taken to complete the technique:

1. Front, profile, and lateral views are shown of the patient's preoperative condition (Figs. 1, 2, and 3).

2. (a) A view of the mouth after extraction of the maxillary incisors is shown (Fig. 4). (b) Maxillary protuberance was reduced by alveoplasty (Fig. 5). Note bone reduction to level of socket apexes of the central incisors.

3. An immediate temporary partial denture was constructed (Figs. 6, 7, 8, and 9). The technique employed was described in DENTAL DIGEST, January, 1959.

4. Postoperative healing was complete after eight weeks (Fige. 10, 11). Frontal and lateral views are shown.

12.
Pink porcelain simulating gingival tissue continuous with porcelain teeth.
13.
Tissue surface of pink porcelain.

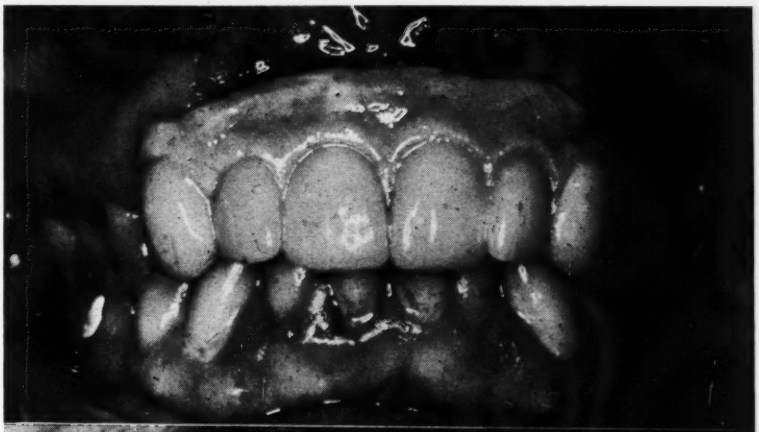
5. A porcelain bridge with full crown preparations extending from cuspid to cuspid was completed (Figs. 12, and 13). Facial and gingival views are shown.

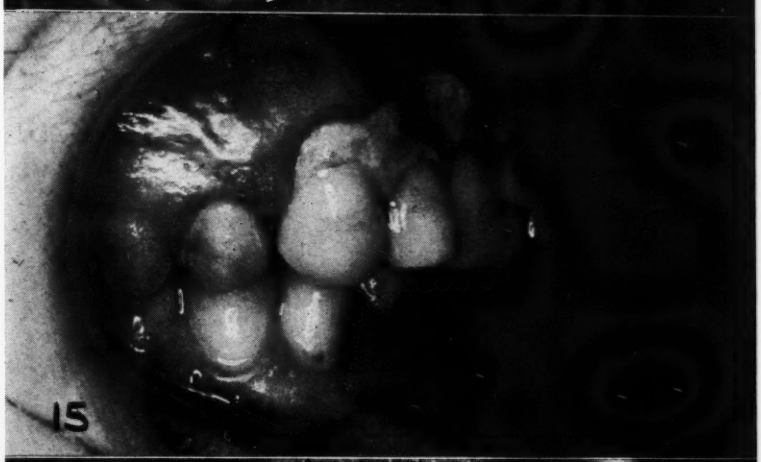
6. The bridge is inserted as shown in Figures 14, 15, and 16. Frontal, lateral, palatal views.

7. In Figures 17, 18, and 19 views are presented of the finished case: frontal, lateral and lateral smile views demonstrate the success of the technique. Compare these illustrations with Figures 1, 2, and 3.

Discussion

Fixed restorations are preferred by the author wherever possible; hence the approach described here. A more conservative technique would employ a conventional partial denture after surgical reduction of the maxilla. Another technique would involve full jacket crowns on the cuspids (to modify their labial prominence) with a removable precision-bridge. Precision attachments, however, have limitations: they require occasional adjustment and when so prominently placed there is always the possibility of such a restoration slipping out of position. This would be especially true where





14.
Frontal view of fixed restoration in situ.
15.
Note adaptation of labial porcelain flange and reduction of original overjet.
16.
Palatal adaptation of porcelain pontic.

there is a tight, high, active lip. Use of one or the other type of removable bridge would satisfy hygienic requirements and allow for inspection of the mesial surfaces of the abutment teeth. If the glazed porcelain is properly adapted to the tissue surface, however, it will remain clean. The restoration presented here has been in place nine months and the tissue is pink and healthy.

115 15*th Avenue North*

17 and 18.
Frontal and lateral appearance markedly improved.

19.
Harmonious, pleasing profile resulting from new upper lip contours.

The Hyperventilation Syndrome

The hyperventilation syndrome occurs in one out of every ten patients attending the office of specialists in internal medicine, and it is by no means rare in this country. The symptoms and signs are due to the excessive removal of carbon dioxide leading to hypocarpia and respiratory alkalosis. The symptoms vary, but apart from the obvious overbreathing, they usually include dizziness, faintness, or nausea, and numbness and tingling around the lips and in the extremities; there are often sensations of discomfort or constriction in the chest. The skin may become cold and clammy, and cyanosis may appear. After an initial rise, the pulse-rate and blood-pressure fall, causing an almost shock-like appearance. These effects are explained by the change in the mechanics of respiration, blood chemistry, and cardiovascular dynamics which accompany the hyperventilation.

Attacks of overbreathing are commonest in anxious persons with unstable cardiorespiratory neurogenic control, and are usually precipitated by sudden emotional stress.

From *Lancet* No. **7087**:1278 (June 29) 1959.

FIXED BRIDGE

Assembled in the Mouth – Part One

COYL B. THOMAS, D.D.S., Lebanon, Missouri

DIGEST

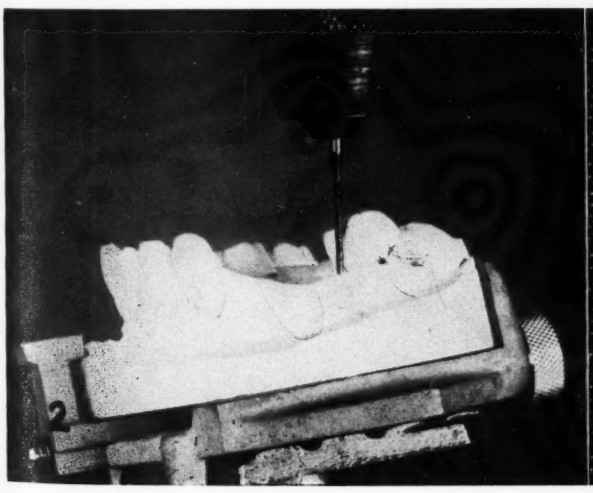
This is the first of four practical articles describing a technique for a fixed bridge cast in two parts and assembled in the mouth. The author of the articles has demonstrated the techniques in clinics on gold restorations for several years. Each step in the procedure is presented in detail and illustrated. It may prove helpful to review previous articles on gold restoration by the author. These appeared in the March, April, and May 1957 issues of* DENTAL DIGEST *under the title "Multiple Inlays—Crowns and Bridges," and the October 1958 issue under the title "Constructing a Lower Fixed Bridge—Extreme Overbite."

Preliminary Measures

Having determined by x-ray examination that the bone surrounding the teeth to be used as abutments (Fig. 1) is sound and that the teeth have good attachments, impressions are made and poured for study casts.

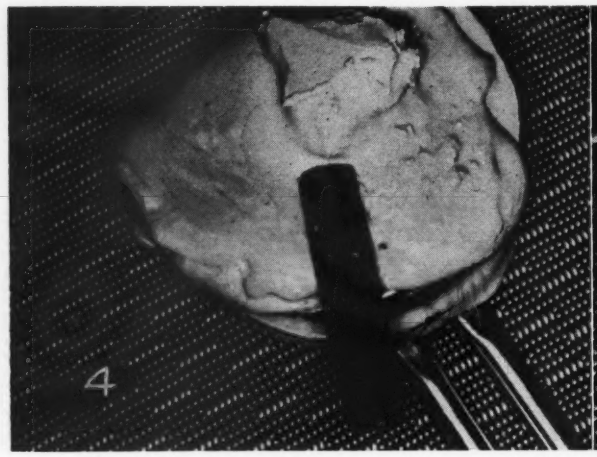
Preparation of Abutment Teeth—Examination of the study cast (Fig. 2) reveals that to prepare the abutment teeth to receive the bridge and have it seated as one rigid unit will require close encroachment upon the pulp of the molar that is to serve as

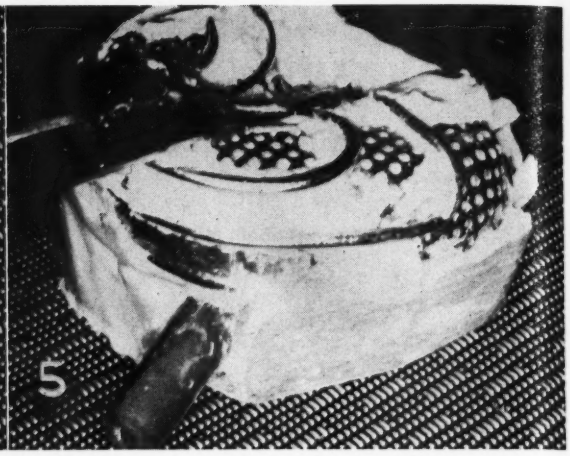
1.
The mouth before starting the technique.



2.
The cast is surveyed.

3.
Impression die pin is placed.





4.
Impression (first pour). The hole-former is in place.

5.
Impression poured (second pour). Hole-former placed.

one abutment. In order to obviate this danger it was determined to cast the bridge in two sections and assemble them in the mouth.

Lateral Incisor Removed — The abutment teeth will not be removed from the cast during construction of the bridge. In order to gain access to the cuspid to wax it up, the lateral incisor is removed from the cast in such a manner that it can be replaced to ensure proper contact.

Technique

The following steps are taken:

1. The impression of the lateral incisor is poured and a dowel pin inserted. The dowel pin is held upright by luting with wax to a toothpick inserted across the opening (Fig. 3). After this has set it is painted with separating medium and the abutment impressions poured with one of the dense gypsum model materials and the remainder of the impression poured with stone leaving about three millimeters of the tip of the pin exposed.

2. A hole-former is prepared by splitting a short length of rubber tubing, such as old saliva ejector tubing, and placing a small amount of modeling clay within one end of the tube. This rubber hole-former is impaled upon the end of the dowel pin with the clay over the end of the pin (Fig. 4).

3. The remainder of the stone mix is placed over the tube and the stone allowed to set (Fig. 5). This hole-former may be removed and by placing an instrument in the hole access can be gained to flip the lateral from the cast.

Alginate Impression of the Molar Abutment—An impression may be made of the tooth in the patient's mouth before preparing the abutment or from the study cast (Fig. 6). The following steps are taken:

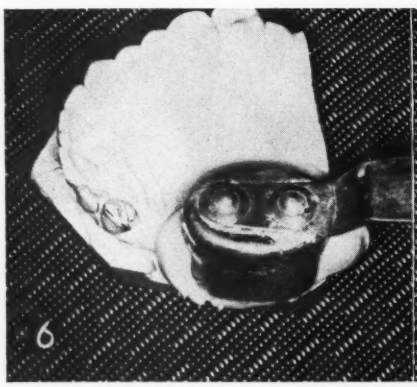
1. After lubricating the molar abutment, melted wax is poured into the tooth impression and the abutment inserted into this melted wax (Fig. 7). After the wax has chilled the impression is removed.

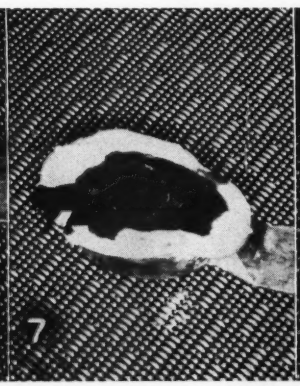
2. Sometimes the wax will come off the abutment and be in the impression (Fig. 8) and since the alginate is soft it may be teased from

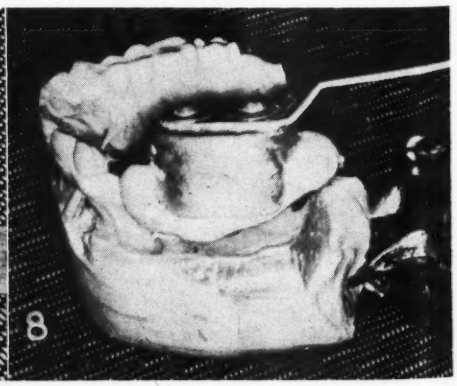
6.
Taking impression of the tooth on the study cast.

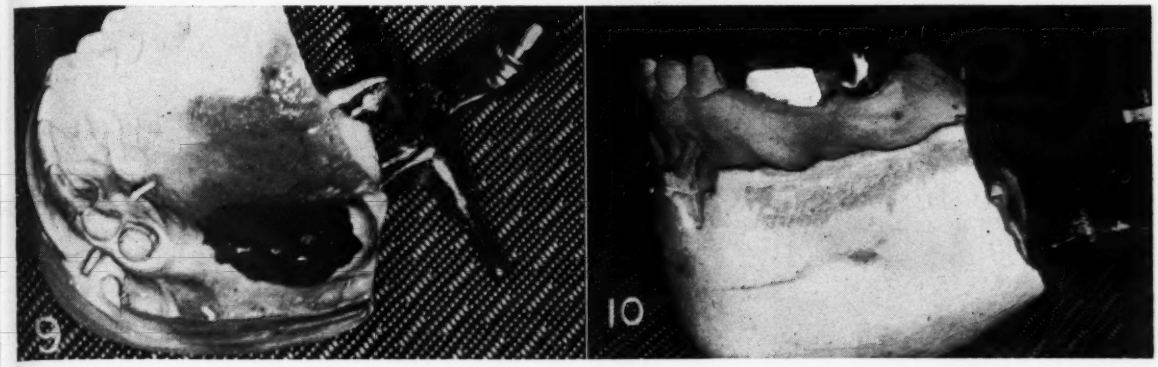
7.
Applying wax to abutment with impression tray.

8.
Wax retained in impression after removal.









9.
Wax on abutment cast.
10.
Cast crown with beam on cast.

the alginate and placed upon the abutment. Sometimes it will remain on the abutment as shown in Figure 9 and will serve as a guide to finish the wax-up.

3. A beam of plastic or wax is attached to this wax crown alining it with the grooves in the three-quarter crown preparation. The wax crown with beam attached is removed, invested, and cast. Figure 10 shows the gold crown and beam mounted upon the molar abutment.

(End of Part One)

125*A West Commercial*

Simplified Procedure for Immediate Dentures

(*Continued from page* 404)

Check the tissue-contacting area for sharp points, trim and smooth as needed, especially in the rugea area. Insert the denture. Although no adherent may be needed at this time, the patient is cautioned that further shrinkage will occur and that an adherent of some kind will usually be helpful. Some patients discontinue the use of adherents at this time.

Final Steps—For the first time, the patient has a properly fitting, comfortable denture, with strong flanges and a postdam. Occasionally some additional spot grinding may be needed. The patient is instructed to return in three months for a second reline if needed. Usually no adjustments will be needed. The reline procedure described applies to all relines. The later relines, however, use so little new material that the operation is simple and requires little time. The final reline is accomplished ten months later.

Patient Instruction—The patient is reminded that the mouth tissues will change throughout life and that in future years further attention may be needed; that the teeth and oral tissues are of the same biologic structure as the skin, hair, and fingernails and will need the same kind of constant care. The patient is dismissed with a definite understanding of the possible dental needs of the future.

Summary

This technique removes many of the variables which often make prosthetic procedures difficult for the dentist. The entire operation takes place in the dentist's own office. From beginning to end, each succeeding procedure is in a definite pattern which does not vary from case to case.

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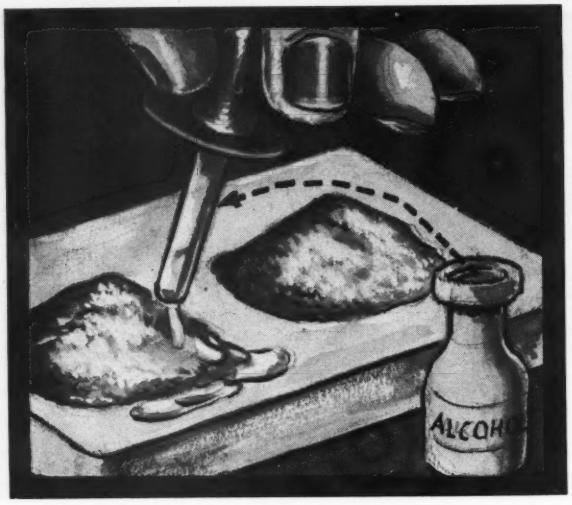


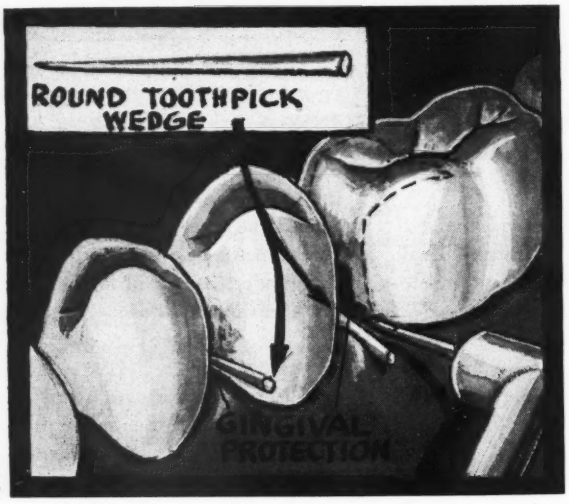
1

Clinical and Laborato

Impressions for Full Dentures

Paul N. Spring, D.D.S., Buffalo, New York

1. When using zinc oxide-eugenol for full impressions mix enough material for both impressions. Divide the mix in two and add 5 drops of alcohol to one portion and spatulate for 5 seconds. This will accelerate the set. The other portion will not set for 3 or 4 minutes. The advantage: both impressions may be taken within 5 minutes from the one mix.

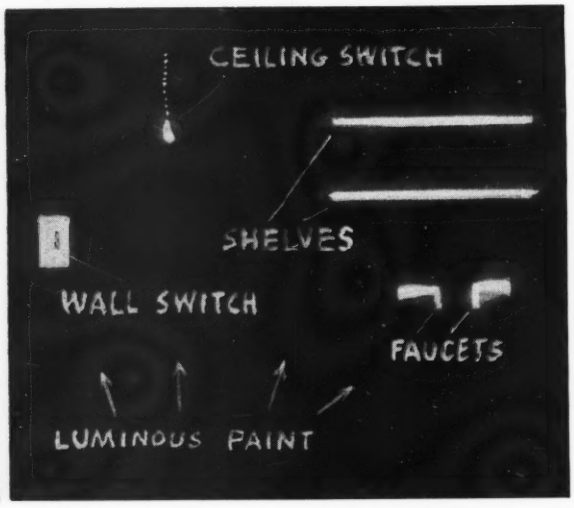


2

Prevention of Hemorrhage During Cavity Preparation

D. K. Miller, D.D.S., Vallejo, California

2. Insert portions of round toothpicks between the teeth at the gingival level. These wedges will prevent laceration of the soft tissue. Hemostatic or astringents will not usually be required to control gingival bleeding.



3

Dark Room Safety

C. E. Folkers, D.D.S., Blue Island, Illinois

3. Paint the light switches, edges and corners of shelves, water faucet handles with Lawter's luminous paint that will glow in the dark.

READERS Are Urged to Collect $10.00

For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay $10 on publication.

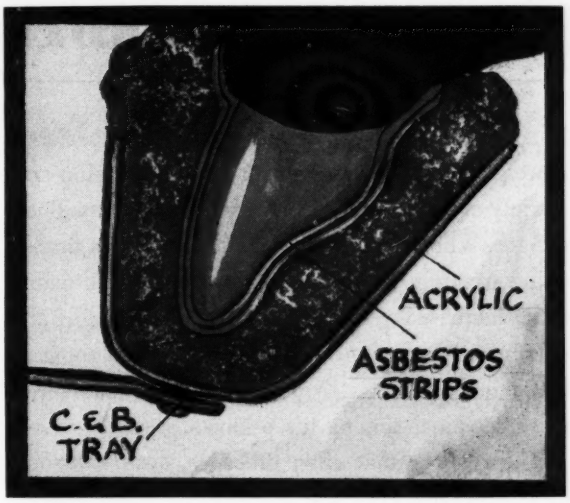
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

SUGGESTIONS . . .

Trays for Silicone and Rubber Impressions

Sanford Kent, D.D.S., Rochester, New York

4. Adapt two sheets of wet asbestos paper to the teeth before the preparations are begun. Fill an impression tray with quick curing acrylic tray material. Insert over the asbestos but remove the tray before the acrylic hardens. After the plastic has hardened peel the asbestos from the impression. Dry the tray, paint with adhesive, and take the impression in silicone or rubber base material.

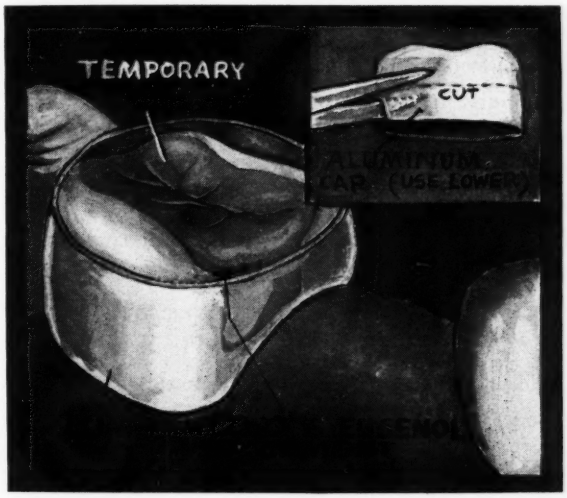


4

Protection of a Temporary Filling

J. L. Westover, D.D.S., Aurora, Colorado

5. In a large inlay preparation or in a tooth that stands alone the temporary filling may be protected from dislodgement by using a contoured band made from an aluminum cap. The band is held in position with the zinc oxide-eugenol cement that fills the cavity preparation.



5

Sterilizing the Bracket Table and Cabinet Top

Louis M. Fleisch, D.D.S., Topeka, Kansas

6. A hand lotion dispenser bottle may be used to spray a germicidal solution on the working surface of the bracket table and the cabinet top.

6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 419 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S *Page*

FOR SOME people the dental treatment experience is weighed heavily with anxiety. Apprehension and anxiety are emotional responses to real or imagined danger. When the person feels that he is in a threatening situation he may react in panic. Rapid heartbeat, increased respiratory rate, blanching of the skin, excessive perspiration, trembling are some of the signs of anxiety. Every dentist has encountered these reactions among his patients.

The syncope that often precedes, occurs during, or is observed after the injection of an anesthetic solution may be an expression of anxiety rather than a reaction from the introduction of a chemical agent. One form of loss of consciousness that is well known to physiologists, but not often considered by clinicians, is the result of overbreathing. An increase in the rate or depth of respiration results in excessive oxygenation of the blood and a reduction in the carbon dioxide reserve. Overbreathing or hyperventilation is frequently associated with anxiety.

Naylor[1] describes an unusual reaction in a 43-year-old woman that occurred after tooth extraction:

"The arms and legs were motionless and fully extended, the fingers were flexed at the metacarpophalangeal joints and the thumbs adducted; from which it was evident that this was not a case of simple syncope.

"The resident medical officer, who was consulted immediately, diagnosed the condition as tetany, and 10 milliliters of aqueous 10 per cent calcium gluconate administered intravenously ten minutes after the onset of symptoms produced dramatic relief. The patient was then able to report that the muscular spasm was preceded by a 'faint feeling' with tingling sensations in the extremities and, as a precautionary measure, she was hospitalized for full investigation.

"Tetany is a disturbance of neuromuscular transmission leading to hyperexcitability and arising as a result of a fall in the ionized serum-calcium level. A hypertonic state of the muscles causes the extremities to assume characteristic attitudes known as carpo-pedal spasm. The hand becomes flexed at the wrist and the fingers at the metacarpophalangeal joints but extended at the interphalangeal joints; the thumb is strongly adducted into the palm and completes the classical picture of the 'Accoucheur's hand' of tetany. The ankles become extended and the toes plantar-flexed.

"In the above case, although no obvious overbreathing was observed either preceding or during the extractions, it seems probable that hyperventilation was the cause of tetany. Hyperventilation does not reduce the total serum calcium, but increased elimination of carbon dioxide without an accompanying reduction in bicarbonate does increase the pH of the blood (Van Slack) and this 'gaseous alkalosis' is believed to cause a reduction in the diffusible serum calcium fraction without altering the concentration of the total serum calcium. Experimental confirmation is technically difficult though clinical observations support this hypothesis and relief of symptoms by the administration of acidifying solutions such as ammonium chloride which relieve the alkalosis adds weight to this argument.

"Overbreathing may occur in association with pyrexia, hysteria, overheating, excitement, and blood donation (Brown) but is particularly common in anxiety states. Rice reported finding symptoms of hyperventilation varying from numbness of the hands, feet, and face to 'stiffness of the muscles and tetany' in 107 out of 1,000 consecutive patients seen in his office practice for such investigations as physical examination, radiography, electrocardiography, blood counts, urine analyses, and metabolic rate determinations. It is surprising therefore that symptoms arising from hyperventilation, including tetany, are apparently so rarely reported in association with dental treatment."

The dentist should consider the hyperventilation syndrome whenever a patient complains of faintness or tingling sensations. The patient should be told to *slow* his breathing rate and *reduce* the depth; *not* to breathe deeply.

[1]Naylor, M. N.: Tetanic Symptoms in the Dental Chair, Br. D. J. **106**:146 (Feb. 17) 1959.

MEDICINE and the Biologic Sciences

Athletic Injuries

Fortunately most injuries sustained in athletic games are slight. The incidence and severity of injuries could be decreased by medical supervision. A thorough preseason examination should be routine. A physician with absolute authority in medical matters should be present at every scrimmage and game.

The natural processes of repair after sprains of ligaments, strains of muscles, and contusions of soft tissue are similar. A hematoma forms at the point of injury and phagocytes invade the destroyed tissue within an hour. Fibroblasts permeate the hematoma and scar tissue eventually forms.

As soon as possible, cold should be applied in an effort to constrict the peripheral arterioles and diminish the rate of formation of the hematoma. Compression with thick soft foam rubber and cotton elastic bandage decreases blood flow and disperses the hematoma. Elevation of an injured arm or leg diminishes the formation of edema. The use of crutches or a sling generally is adequate. Occasionally light plaster of paris splints are necessary.

A player with a sprained ankle should not bear weight on that foot. A foam rubber compression dressing is applied after a careful examination which includes roentgenographic study. The leg is then immersed in cold water for thirty minutes and the compression dressing is replaced. The patient should elevate the leg above the level of the heart whenever possible.

The particular ligaments involved and the degree of sprain can be determined twenty-four hours after the injury. Since further hematoma is unlikely, heat in the form of a whirlpool bath and light centripetal massage are employed to increase blood and lymphatic flow and facilitate dispersal of waste products of the injury. Diathermy is never employed for recent joint injuries because effusion is a common result.

On the fourth or fifth day at the latest, active exercise against resistance within limits of pain is begun. The injured ligament should be protected by adhesive tape every time the player participates in contact sports.

More vigorous therapy may be necessary for severe injuries. When a ligament, muscle, or tendon is completely ruptured, surgery is preferred to prolonged immobilization in plaster. Contusions rarely require operative therapy, but aspiration and injection of a hematoma through a short incision is occasionally necessary.

Quigley, T. B.: Athletic Injuries: Some Observations of their Prevention and Treatment, Nebrasks M. J. **42**:435-440 (September) 1957.

Contact Lenses

There are two general types of contact lenses: scleral, and corneal. The scleral type overlies the sclera and cornea with a well-marked difference in curvature marking their junction. It is worn with a layer of fluid between the lens and the cornea. A modification of this type of lens is the lacrimal type which is molded in a single curve extending over both the sclera and the cornea. It is fitted much closer to the eye than the ordinary scleral type. The tears constitute the fluid between the cornea and the inner surfaces of the contact lens.

The corneal lens is a thin wafer worn directly on the cornea and held in position by the capillary action of the tears. It does not require the addition of any fluid. Corneal lens are used in eyes in which the curvature of the corneum is relatively regular. Marked corneal astigmatism may require the use of a scleral lens.

The chief medical indication for contact lenses is a regular astigmatism caused by a corneal abnormality in which the maximum optical correction is not obtained with ordinary lenses. The commonest condition in this category is keratoconus, in which contact lenses often yield a surprising improvement in vision.

Professional entertainers and athletes are frequently better able to participate in their activities with contact lenses. Athletes in body-contact sports frequently use them, and there is no great danger involved since the contact lens is cushioned on the globe symmetrically and protected by the same structures which protect the eyes.

Many persons cannot wear contact lenses because of narrowness of the palpebral fissure, tightness of the lids, nervousness or conjunctival irritation. The lenses are probably contraindicated in patients with glaucoma since the corneal edema of glaucoma is identical with that caused by contact lenses. Unless there is an optical reason which outweighs the seriousness of a recurrence of the original disease, they should not be worn when the cornea has been the site of an inflammation. Persons in whom the conjunctiva becomes infected or injected with slight provocation are poor candidates. Many patients after wearing them a short time, particulary when they are being used only to satisfy vanity, become discouraged and discontinue wearing them. Despite the large number prescribed in recent years, suprisingly few people

wear them with any regularity.

The two main difficulties that occur when contact lenses are worn are irritation of the cornea and conjunctiva, and corneal edema. Irritation arises from the presence of a foreign material beneath the lid and commonly prevents some persons from ever wearing them for a useful length of time. Contact lens wearers should be warned against persistence of wearing the lenses once there are symptoms of irritation or corneal edema.

Questions and Answers: Contact Lenses, JAMA **166**:1926-1927 *(April* 12) 1958.

Whiplash Injuries

In many auto accidents sudden arrest of propulsion of the body when the head and neck are unfixed is frequent. When a rear end collision occurs, the body is abruptly accelerated by the force imparted through the back of the car seat. As the head, neck, and shoulders lag behind they are hyperextended. When the vehicle stops, the head and neck are whipped forward and sustain another shock at the limits of hyperflexion. Before the head comes to rest several oscillations may occur.

Even if the head strikes nothing, the forces of acceleration and deceleration are considerable, especially at the atlantooccipital junction. In addition to the usual strain of the neck muscles and ligaments, frequently the vertebral arteries, nerves, and the vertebral column may be injured. Small fragments of the vertebral bodies separate, the intervertebral discs are injured or dislocation occurs. Momentary unconsciousness or actual concussion may accompany the trauma. Also, if the arms are free, hyperflexion and hyperextension of the upper thoracic spine may injure the shoulder girdle or the nerves of the brachial plexus.

When judging the trauma sustained it is important that the exact information regarding the direction of the crash or force, the position of the patient, and the degree of bracing by muscles or from steering wheel or seat belts be known. Early x-ray examination is of great importance. Several angles are needed for accurate diagnosis.

Concussion, ruptured disc, dislocation, or severe sprain demand hospitalization. Usually treatment offers no great difficulties. Injured muscles and ligaments may require considerable care, however, with rest, heat, massage, sedatives, and cervical traction. Hospitalization of patients with minor sprains may only heighten the emotional distress of the injury and aggravate complaints and disability. Convalescence and discomfort may persist for as long as a year.

Many whiplash injuries are implicated in legal settlements. Therefore careful and meticulous records should clearly separate objective and subjective findings.

Hawles, C. D.: Whiplash Injuries of the Head and Neck, Arch Surg. **75**:828-833 *(September)* 1957.

Malignant Melanoma

Malignant melanoma is found in the feet much more frequently than in the hands. The incidence is greater than is usually realized.

For subungual and digital malignant melanomas on the feet disarticulation at the metatarsophalangeal joint or amputation through a metatarsal bone is done. Dorsal and plantar lesions are excised widely with immediate application of a skin graft of intermediate thickness. Subcutaneous tissue and deep fascia are included in the dissection except on the dorsum. Here the fascia is spared, if possible. For a lesion of the heel, excision and use of a split-thickness skin graft are satisfactory when a small rim of heel is left to bear pressure.

About 34 per cent of patients survive five or more years without metastasis after the excision of a primary lesion. In patients in whom groin metastasis occurs, about twenty months elapse before spread is detected. If groin dissection is done at this time approximately 10 per cent of patients live ten additional years.

To control metastasis, inguinal lymph nodes and glands should probably be excised on an elective and provisional basis at the time of treatment of the primary lesion. After a superficial groin dissection is performed, a frozen section is made of the resected nodes. If metastasis is found, a radical groin dissection is completed; if not, the superficial groin dissection is adequate.

The five-year survival rate is 40 per cent for such prophylactic dissection when microscopic study shows no metastasis to lymph nodes. When inguinal nodes are not palpable, but microscopic study shows metastatic spread, the five-year survival rate is about 20 per cent.

Primary melanoma of the hand is treated by local excision and simple or radical amputation. When primary resection only is done for patients without apparent metastasis, the five-year survival rate is 40 per cent. When axillary dissection is performed for obvious metastasis, the five-year survival rate is about 17 per cent.

Bocher, Robert J., and Pack, George T.: Malignant Melanoma of the Feet and Hands, Surgery **42**:1084-1121 (*December*) 1957.

Obesity

Today the worst enemy of health is surplus fat. Obesity aggravates cardiovascular degeneration, diabetes, biliary and renal ailments, arthritis, and many other disorders. Also surgical risks and tendencies to accidents are increased.

It is evident that current customs and environmental conditions encourage overeating and underactivity. People consume more animal protein, fat, and sugar than formerly and often eat and drink between meals.

Occupations are more sedentary and caloric needs are less than formerly. Modern transportation and communication lessen the need for physical activity. Recreation such as movies, radio, and television occupies

(*Continued on page* 419)

25th
year
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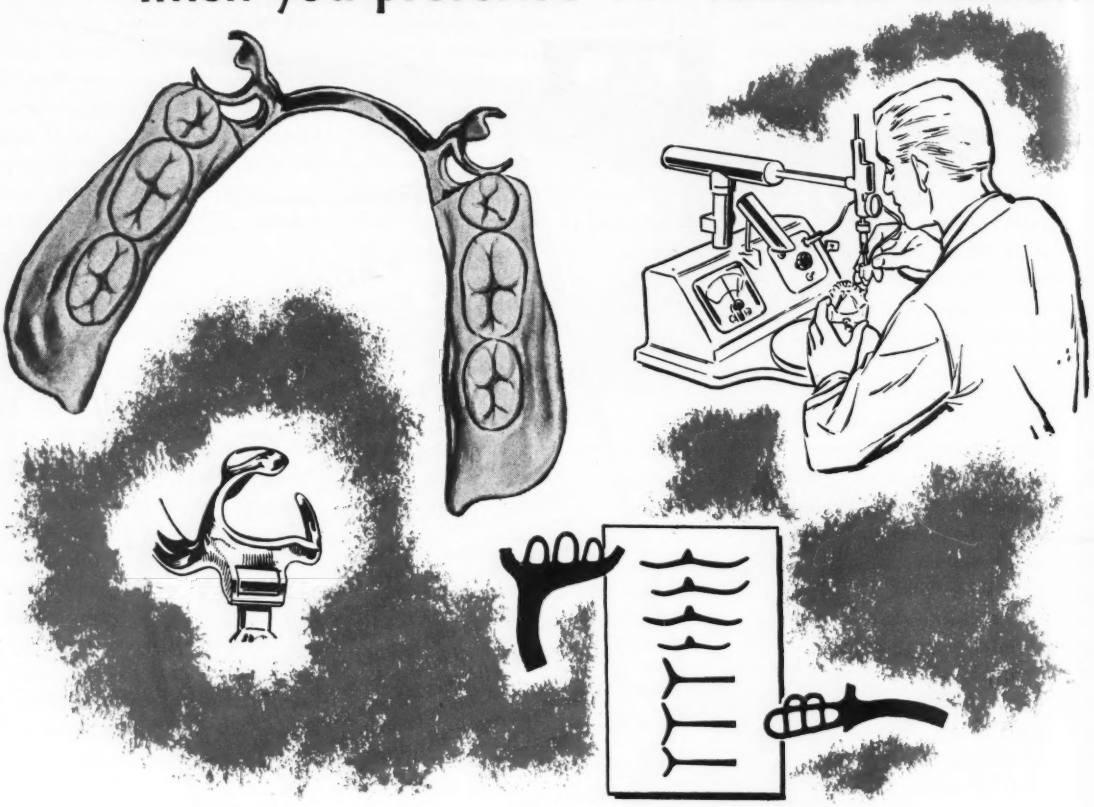

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free time of many persons. If food supplies only 100 more calories per day than are needed, about 10 pounds will be gained in a year.

At least 20 per cent of all adults in this country are overweight to an extent that injures health. Obesity is becoming increasingly important as more people live to ages when fat is easy to acquire and hard to lose and when chronic degeneration diseases are most common.

Obesity influences the prevalence of hypertension, atherosclerosis, diabetes, gallbladder disease, hernia, and cancer of the endometrium. Excessive weight may cause postural derangement, shortness of breath, and intolerance to heat. It also adds to hazards to pregnancy and surgery.

Weight gain with increasing age is not normal. Since fat usually replaces active tissue as a person grows older, weight should possibly be kept stable or slightly reduced after 25. Exercise does not greatly affect weight unless habitual and may sharpen the appetite. Reducing drugs, including fillers, appetite depressants, and metabolic stimulators, generally have only temporary value and obscure the cause of obesity.

Composition of diets, distinct from total caloric value, apparently affects rate of weight loss. The influence of dietary content upon energy expenditure may explain why many fat persons do not lose weight as expected when caloric intake is restricted. Overweight persons eating foods that supply 1,000 calories per day lose weight most rapidly when fat provides 90 per cent of calories and most slowly when carbohydrates supply 90 per cent of the calories. Differences in weight reduction are not accounted for solely by variations in body water or in absorption from the digestive tract.

During short periods of dieting, the composition of meals does not influence the basal metabolic rate. The metabolism of overweight persons appears to differ in certain respects from that of nonobese subjects. Weight changes of obese persons are

(*Continued on page* 420)

CLINICAL AND LABORATORY SUGGESTIONS

(See pages 412 and 413)

Form to be Used by Contributors

To: Clinical and Laboratory Suggestions Editor
DENTAL DIGEST
708 Church Street
Evanston, Illinois

From: _____

_____

Subject: _____

Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.
$10 will be paid on publication for each suggestion that is used.

Sharp Increase in Use of Myerson's Plastic Teeth

Experience with Myerson's Dura-Blend Plastic Teeth Validates Research

Recent figures show an increase of 58% in the use of Myerson's Dura-Blend plastic teeth. Thus has large scale clinical experience confirmed the findings of the "detectability" test and other studies reported when 13 new moulds and 3 new shades were recently added. The importance of these new additions is shown by the fact that they now account for close to 40% of all the Dura-Blend teeth used.

Dentures Found Improved Three Ways

As expected from the preliminary research, in actual use, dentists found the new developments to be of advantage in three principal ways. This is shown in the analysis that follows of the hundreds of voluntary statements received.

(1) 46% of the statements praised the *"naturalness" and "esthetics"* of the new Dura-Blend developments. This validates the results of the series of detectability tests conducted at 1958 meetings of Dental Societies in which only 10.7% of the participating dentists were able to accurately distinguish Dura-Blend plastic teeth from natural teeth. (See table below.)

Meeting	No. of Participants	No. of Correct	% Correct
Boston	138	11	8.0
Buffalo	112	14	12.5
Toronto	104	13	12.5
TOTAL	354	38	10.7

Dura-Blend detectability test results. Full details may be secured by requesting Reprint DB 1.

(2) 28% laid specific emphasis on advantages derived from *the three new shades*. Previous study had shown the augmented Dura-Blend shade guide capable of yielding first choice in match to natural teeth 44% more often than any other of the shade guides tested.

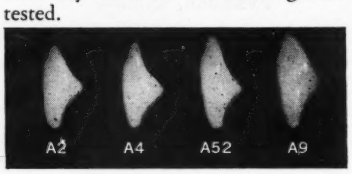


Figure 1. Slender forms, longer ridge laps typical of the new Dura-Blend moulds.

(3) 26% found greatest cause for comment in the new Dura-Blend *moulds* which had been added based on an investigation of possible improvements in this phase (see Figure 1).

Evaluation Assortment Available

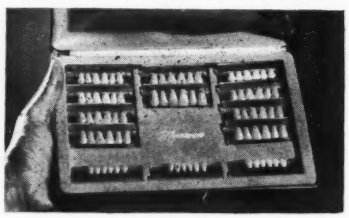


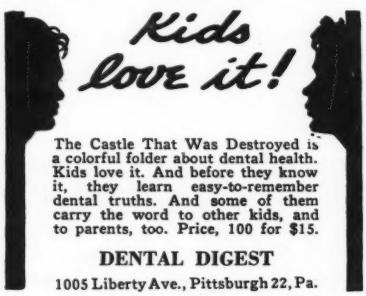
Figure 2.

A special Evaluation Assortment (#DB-13) has been prepared containing the new Dura-Blend moulds and shades. Arrangements will be made to show it to you upon request — without obligation on your part. Address: Myerson Tooth Corporation, 91-90 Hamilton Street, Cambridge 39, Mass.

not associated with significant decrease of body protein. Obese subjects tolerate high-fat diets well for as long as two weeks.

For many persons, being fat is a balancing adjustment to life. If overeating prevents serious disturbances, correction may be dangerous. In such cases, surplus weight should be removed only after considerable improvement in the total adjustment. Substitutes for overeating may be found through psychotherapy.

Symposium on Obesity: Metabolism **6**:404-465 (*November*) 1957.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Contra-Angles

Things you Learn at a Seminar!

A SEMINAR is a meeting where the seeds of knowledge are supposed to be planted. How successful it is depends on the skill of the "planter" and the nature of the "soil." If the teacher is inattentive to his planting and the participants are sterile in their reception of the seed no benefits come from attendance at such a meeting. It is time and money lost.

Most of the seminars that I have attended are "fertile" indeed. Dentists gather in congenial surroundings. The meetings are shirtsleeve in informality. Participation is encouraged. There is a good fellowship and good will. It is time and money wisely spent to attend such meetings.

A seminar on The Therapeutic Use of Drugs, sponsored by the Odontographic Society of Chicago for its members, fulfilled the ideal: it was organized and conducted for practical and clinical value for dentists; it was cleanly balanced in content and with effective teachers; it was held at a country lodge where recreational activities were available; it was open to members of the Society and their families.

The theme of this seminar was that dentists are trained to make therapeutic use of many varieties of drugs; that they are licensed by a State and by the federal government to use drugs in any manner that may be indicated to relieve pain, to control infection, and to calm the emotions. A dentist may use "any drug for the treatment of a disease associated with the oral cavity, that is, a systemic disease with local symptoms or a local disease with systemic symptoms."

(*Continued on page* 425)

Gustav W. Rapp, Ph.D. of Loyola University, School of Dentistry (Chicago) described the activity of a drug to benefit the sick in these words:

"1) cures by killing or destroying invading inciters;

2) corrects disturbed function of an organ;

3) mitigates unpleasant symptoms of a disease;

4) fortifies the body's natural capacity to fight disease;

5) replaces or is a substitute for missing ingredients in diet or for deficient glandular secretions;

6) distracts the patient's attention from the disease;

7) acts in some yet unknown way."

It is widely known that dentists do not use drugs in their practice as often as they should or prescribe them for their patients where their use is indicated. These attitudes are breaking down. Dentists are writing more prescriptions and are becoming more attentive to the indications and character of drugs and their action. Empiricism is giving ground and dentists are wanting to know more about the rationale of drugs and their uses.

The reduction of anxiety, the control of pain, the alleviation of postoperative distress are among the major interests of dentists. Max S. Sadove, M.D., Professor of Anesthesiology, University of Illinois presented this part of the seminar.

In a plea for more attention to history-taking by dentists before giving an anesthetic or prescribing drugs, Doctor Sadove suggested five simple questions that the dentist should ask his patients:

1) Have you been to any kind of medical practitioner in the last 10 years? For what?

2) What diseases or illnesses have you suffered from?

3) Have you had any operations or have you sustained any injuries?

4) Do you faint? Sleep on two pillows? Do your ankles swell? Are you short of breath?

5) How many flights of stairs can you climb?

The answers to these simple questions will give important information and clues on the past and present health status of the patient and will alert the dentist to any systemic diseases that might complicate dental treatment, particularly disease of the cardiovascular system.

The practice of dental medicine requires that the dentist see the patient-as-a-whole and not just his dental mechanism. Dentists are morally and legally responsible to see more than teeth when a patient presents himself for treatment.

Thomas L. Grisamore, D.D.S., M.D., Professor of Pathology at Loyola University, presented a formula to describe the nature of infection: $D = \frac{NV}{R}$. This means that the *degree* of infection is determined by the *number* of bacterial organisms and their *virulence* versus the *resistance* of the host. In this equation when *number* and *virulence* are high and *resistance* is low an overwhelming type of infection may result. When *all* values are low infection may or may not occur. When *number* and *virulence* are low and *resistance* is high there is less likelihood of infection. When considering this formula

(*Continued on page* 428)

NEY — AMERICAN DENTAL ASSOCIATION 100 YEARS 1859 1959

The occlusal rest

FIG. A FIG. B FIG. C

Occlusal rests supply a substantial portion of the support required for the clasp type of partial denture. They must resist the heavy masticatory load and yet maintain the correct clasp-to-tooth relationship. Sometimes no rest seat is prepared in the abutment tooth, leaving only room enough for a thin rest which soon breaks (Fig. A).

The rest preparation in the abutment tooth should be definite but not box-shaped as in Fig. B. A sharp angle at the marginal ridge produces a corresponding angle in the casting that may cause fracture.

The ideal rest preparation (Fig. C) is spoon-shaped with its floor at right angles to the long axis of the tooth. Bucco-lingually its width is about one-half the distance between the buccal and lingual line angles of the surface involved. Sharp angles are smoothed and the prepared enamel surface is carefully polished.

SAY NEY BEFORE YOU SAY Gold

(Prepared under the direction of competent dental authority.)

NEY-ORO A-1 inlays B-2 bridges G-3 partials

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For Dentists
and Physicians

How to sharpen your DIAGNOSTIC SKILL

The information from a shelf of textbooks has been compressed into the easily-read, rotating 11¼" dial chart, ORAL DIAGNOSTIC SIGNS. Use of the chart will save you hours of searching through reference material.

The mouth is a mirror that reflects the manifestations of many systemic diseases. One hundred of these system diseases are included on ORAL DIAGNOSTIC SIGNS. The lesions that may appear on the lips, buccal mucosa, tongue, gingiva, and palate are described on the chart.

The dentist encounters lesions of the mouth that should alert him to consider diseases of nutritional or hormonal imbalance, of malignancy, of bacterial or viral origin. In such cases, the dentist should refer the patient to the physician for more thorough examination and treatment. The physician observes lesions of the mouth that may be of mechanical or local infective origin. In such cases, the physician should refer the patient to the dentist for definitive treatment.

The dentist, because he often sees the patient before the physician sees him, has the opportunity to become an important member of the health team by detecting the early expressions of systemic disease. Early detection and treatment of these conditions will save lives!

Every dentist and physician—whatever his specialty or field of particular interest—should have a copy of this important diagnostic aid! Send for your copy today!

ORAL DIAGNOSTIC SIGNS has been prepared by Edward J. Ryan, D.D.S., Editor of Dental Digest, and E. Cheraskin, M.D., D.M.D., Professor of Oral Medicine, University of Alabama.

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100 diseases are classified under these ten categories on the chart

1. Diseases Due to Biologic Agents
2. Physical Agents
3. Chemical Agents
4. Neoplasms
5. Cysts
6. Hormonal Disturbances
7. Developmental Disturbances
8. Nutritional Disturbances
9. Reactions to Stress and Antigentic Substances
10. Miscellaneous Disorders

the infinite variety and combinations are important. The solution to the riddle of disease is in understanding and unraveling these combinations of N, V, and R.

The destruction of bacteria in number and virulence is done by natural forces within the body and sometimes by the introduction of antibacterial drugs. The building of resistance is by the built-in natural aggressive and passive defense mechanism of the body produced by antibodies, by nutrition, and by artificial humeral mechanisms that are created by man to stimulate the natural defenses (toxoids, vaccines, immune sera).

The theme of this entire seminar might be stated: Drugs for the control of infection, for the relief of pain, for the tranquilizing of the emotions are important in dental practice. We should acquaint ourselves in more detail with the nature of drugs and their actions. We should use more of them and use them wisely. We should dignify our therapy and ourselves by writing prescriptions rather than by giving vague, confusing, misleading verbal instructions. Finally, we should not *undersell* the marvelous defensive and recuperative powers of the body by *overselling* any drug.

Down with "Wonderful"!

One of the most overworked, hackneyed, trite words in the English language is "wonderful." The word is a perfectly good and beautiful one when used sparingly and with precision: to express wonder or admiration. Some of the synonyms are more precise in meaning: marvelous, remarkable, surprising, astonishing, extraordinary, phenomenal, for example.

If you wish to do a bit of "research" (another pompous and overworked word) take a pencil and paper and check the number of times "wonderful" is used on television programs during one evening. There will be "wonderful" gasoline, soap, beer, cigarettes. "Wonderful" women, athletes, politicians, dogs, race horses. "Wonderful" plays in baseball, football, basketball. "Wonderful" arias, comedy, drama.

Another secret project might be to count the number of times "wonderful" crops out in the conversation of your friends. But keep it secret! People do not wish to have their speech exposed or corrected.

When any word or expression becomes threadbare it loses the niceties of meaning. A grunt becomes more effective. A constant flow of profanity has the same meaningless tone. An occasional expletive may add vigor and color to speech. A steady outpouring of profanity and crudity represents a poverty of expression. It is more an offense against style than against taste.

No one should strive for stilted "Dandy Dan" or "Nifty Nettie" speech. Let the TV announcers, pitchmen and performers do that. No one should be encouraged to acquire a phony accent or to put on airs of speech. Naturalness in anything is to be approved. Naturalness, however, does not mean slovenly speech or that we should absorb the mannerisms or acquire the clichés of everyone around us. "Wonderful" is headed toward the scrapheap of clichés where it will lose identity and meaning. That will be too bad, because the word has a well-rounded, drawn-out tone that has wide-eyed and pleasant connotations when used at the right time and in the proper place.

This crusade (another overloaded and overworked word) for the preservation of the purity of "wonderful" will not win a popularity contest among advertising copywriters or among the dear women around most of us.

—E.J.R.

Clinical Evaluation of a New Ultrashort-Acting Oxygen Barbiturate for Intravenous Anesthesia

RUTH WEYL, M.D., BAHA UNAL, M.D., and Y. ALPER, M.D., Chicago

Summary and Conclusion

A new ultrashort-acting oxybarbiturate methohexital sodium (25398) seems to come up to expectations. In a series of 200 unselected cases, it provided smooth rapid induction, adequate maintenance, and prompt awakening with the use of either a 1 per cent solution for intermittent intravenous injection, or a 0.2 per cent intravenous drip.

Dosage—Amounts of the drug necessary for the purpose are small as compared with the thiobarbiturates.

Advantages—(1) The drug seems to be metabolized quickly. (2) It supplies good jaw relaxation, so that a pharyngeal airway can be introduced early. (3) Laryngospasm did not occur in this series. (4) The compound provides an adequate state of analgesia; this is best achieved by the slow drip method. (4) The compound can be used in connection with the usual inhalants and relaxants. (5) No convulsions occurred in this series, and no venous irritation at the site of the injection was noted.

Conclusion

Compound 25398 seems to be a safe agent in the hands of the experienced anesthetist. It deserves further evaluation.

Adapted from *Surgery, Gynecology and Obstetrics* **167**:592 (Nov.) 1958.